CANADA
DEPARTMENT OF MINES
MINES BRANCH

HON. W. TEMPLEMAN, MINISTER; A. P. LOW, LL.D., DEPUTY MINISTER;
EUGENE HAANEL, PH.D., DIRECTOR.

AN

# INVESTIGATION

OF THE

# COALS OF CANADA

## WITH REFERENCE TO THEIR ECONOMIC QUALITIES:

AS CONDUCTED AT McGILL UNIVERSITY, MONTREAL,
UNDER THE AUTHORITY OF THE DOMINION
GOVERNMENT

IN SIX VOLUMES [& Extra vol.]

BY

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# THE

# COALS OF CANADA:

# AN ECONOMIC INVESTIGATION

## VOL. III

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## APPENDIX I

## DETAILED RESULTS

OF THE

## COAL WASHING TRIALS

BY

J. B. Porter

## TABLE OF CONTENTS.



1. This list contains only the samples which were included in the coal washing investigation. A complete list of all samples taken is given in Vol. I, p. 8, and Vol. II, p. 181.

ERRATUM

On the curve diagrams accompanying the tabulated records of each of the coals tested, is the following legend:—

LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " material floating at the several densities.

The above legend is incorrect: in each case it should read thus:—

○ Curve showing the relative quantities of the several sizes.
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# DETAILED RESULTS

OF

# COAL WASHING TRIALS

BY

J. B. PORTER.

## INTRODUCTORY.

In the autumn of 1906, the Canadian Government, through Dr. A. P. Low, Director of the Geological Survey, decided to undertake a study of the fuels of the Dominion, somewhat on the lines of the fuel tests which had already been commenced by the United States Geological Survey. But inasmuch as the Government had not, at Ottawa, any suitable mechanical laboratories, and as research work had already been done by the Mining Department of McGill University on a number of western coals, Dr. Low invited Dr. Porter, the head of that department, to undertake the larger investigation. This proposal was approved by the University governors, and Dr. Porter was authorized to carry out the tests in the University laboratories, without charge; on the understanding that the Government would pay for such apparatus as might be required to supplement the existing equipment, and to make good all additions to the salaries, wages, and supplies accounts rendered necessary by the investigation. At the request of Dr. Low, also, the Intercolonial and Canadian Pacific railways very generously agreed to haul the material—amounting to many hundreds of tons—free of charge.

Shortly after the commencement of the investigation the Dominion Department of Mines was created, under the Hon. William Templeman, as Minister of Mines, and Dr. A. P. Low, as Deputy Minister; and the investigation, together with all matters relating to economic minerals, was transferred from the Geological Survey to the Mines Branch, under the Directorship of Dr. Eugene Haanel. The original arrangement was, however, in all other respects, continued without change.

From the beginning it was intended to confine the investigation to the coals and lignites of the Dominion; and the following points were covered by the scheme:—

Sec. I.—General organization and administration.
II.—Preparation of a general summary report on Canada's coal fields and coal mines.
III.—Sampling in the field.
IV.—Crushing the samples and preparing them for treatment.
V.—Washing and mechanical purification.
VI.—Coking trials.
VII.—Steam boiler trials.
VIII.—Producer, and gas engine trials.
IX.—Chemical laboratory work, and miscellaneous investigations.

TECHNICAL STAFF.

The technical staff engaged in the investigation, comprised:—

(1). J. B. Porter, E.M., Ph.D., D.Sc., Professor of Mining Engineering, McGill University—Responsible for the organization and general directions of the investigation, and directly in charge of Sections I, IV, and V, and VI (in part).

(2). R. J. Durley, B.Sc., Ma.E., Professor of Mechanical Engineering, McGill University—in charge of Sections VII and VIII.

(3). Theo. C. Denis, B.Sc., Mines Branch, Department of Mines, Ottawa—In charge of Sections II and III (in part).

(4). Edgar Stansfield, M.Sc., Chief Chemist—In charge of Section IX, and Sections III and VI (in part).

(5). H. F. Strangways, M.Sc., Dawson Fellow in Mining, McGill University—Assistant in Sections IV and V, 1907.

(6). H. G. Carmichael, M.Sc., Dawson Fellow in Mining, McGill University—Assistant in Sections IV and V, 1908.

(7). E. B. Rider, B.Sc., Demonstrator in Mining, McGill University—Assistant in Sections IV and V, 1909-10.

(8). Chas. Landry, Chief Mechanic of Mining Department, McGill University—Foreman in Sections IV and V.

(9). J. W. Hayward, M.Sc., Assistant Professor of Mechanical Engineering, McGill University—Assistant in charge of Section VII, 1907, and preliminary work in Section VIII.

(10). J. Blizard, B.Sc., Lecturer on Mechanical Engineering, McGill University—Assistant in charge of Section VII 1908, and Assistant in Section VIII.

(11). D. W. Munn, M.A. B.Sc., Demonstrator in Mechanical Engineering, McGill University —Assistant in Sections VII and VIII.

(12). G. L. Guillet, M.Sc., Demonstrator in Mechanical Engineering, McGill University—Assistant in Section VII.

(13). G. Killam, M.A., B.Sc., Demonstrator in Mechanical Engineering, McGill University—Assistant in Section VIII.

(14.) J. S. Cameron, B.Sc., Demonstrator in Mechanical Engineering, McGill University—Assistant in Section VIII.

(15). A. Balmfirth, Superintendent of McGill University Power House—Foreman in Section VII.

(16). J. Gardner, Foreman in Section VIII.

(17). J. Hoult, Fireman in all tests of Section VII.

(18). J. H. H. Nicolls, B.Sc., Assistant Chemist—Assistant in Section IX 1908, 1909.

(19). R. T. Mohan, B.Sc., Assistant Chemist—Assistant in Section IX 1908.

(20). P. H. Elliott, M.Sc., Assistant Chemist—Assistant in Section IX 1908.

(21). E. J. Conway, B.Sc., Assistant Chemist—Assistant in Section IX 1908.

(22). W. B. Campbell, Assistant Chemist—Assistant in Section IX 1909.

(23). R. S. Boehner, M.Sc., Demonstrator in Chemistry, McGill University—Assistant in Section IX 1908, 1909.

(24). H. Hartley, B.Sc., Assistant Chemist—Assistant in Section IX 1909.

(25). W. P. Meldrum, B.Sc., of the Department of Chemistry, McGill University—Assistant in Section VI 1909.

(26). H. H. Gray, B.Sc., Demonstrator in Metallurgy, McGill University—Assistant in Section VI 1909.

(27). H. G. Morrison, B.Sc., Assistant Chemist—Assistant in Section IX 1909, 1910.

There were also a number of machinists, mechanics, and labourers engaged more or less continuously in the several sections.

In addition to the persons above named, the following members of the University staff very materially aided in the progress of the work by giving occasional assistance and advice:—

Alfred Stansfield, D.Sc., Professor of Metallurgy.

H. T. Barnes, D.Sc., Professor of Physics.

Acknowledgment is also due to the Governors of McGill University, and to W. Peterson, C.M.G., Principal; F. D. Adams, F.R.S., Dean; W. Vaughan, Esq., Secretary; S. R. Burrell, Esq., Chief Accountant, and many others.

## LABORATORIES.

The laboratories of the Mining and Mechanical Departments of McGill University, in which the tests were made, were built and equipped some few years ago on a scale unequalled at the time in North America, the buildings and apparatus for the Ore Dressing Department alone costing over $150,000, and the Steam Laboratory an almost equal sum. This equipment needed very little augmentation in respect of sampling, crushing, coal washing, steam boiler tests, and chemical analysis; although a number of minor pieces of appartus had to be purchased, such as extra calorimeters, pyrometers, thermometers, etc., etc.

In the matter of producer and gas engine tests, larger expenditure was necessary, as the University equipment was on too small a scale for the extensive tests contemplated. An addition 25 × 70 was, therefore, built to the Ore Dressing Laboratory, and equipped with a complete plant of the most modern type, the cost for building and plant being approximately $12,000. A detailed description of this plant, with cuts of the apparatus, etc., will be found in Vol. II, Part VIII, of the report, and similar descriptions of the apparatus used in the other parts of the investigation will be found in the other parts.

## THE INVESTIGATION.

### *Sampling in the field.*

Sixty-three separate mines of seams were specially sampled for the investigation. The work of sampling was always done by a responsible member of the technical staff and every precaution was taken to ensure reliability. The general rules governing this sampling, and the detailed descriptions of the work of sampling at the several mines are fully stated in Vol. I, Part III.

A list of the samples arranged in geographical order is given in the table of contents of each volume of the appendices III, IV, V, and VI, and is also printed in the text of the report proper, Vol. I, pp. 8 to 11, and Vol. II, pp. 181 to 184.

### *Crushing and Sampling in the Laboratory.*

The main samples on their arrival at the testing plant at McGill University were all crushed to go through a 2″ screen, mixed thoroughly on a large granolithic sampling floor, sampled for the chemist, etc., and finally resacked, sealed, and sent to a dry room for storage while awaiting test.

The methods of sampling are stated in detail in Vol. I, Part IV.

The smaller subsidiary samples were sent directly to the chemical laboratory, where they were stored in sealed vessels until required.

### *Mechanical Purification.*

Each main sample was experimentally treated in the laboratory with heavy solutions, and the fractions analysed with a view to determining the probable results of washing. In all cases where these preliminary tests gave favourable results, a large lot was treated in the coal washing plant of the University, which includes a specially designed experimental two compartment slide motion jig, a Robinson washer, and much secondary apparatus. This jig had been specially remodelled for coal washing work, and is provided with adjustable feed and side discharge devices for automatically removing the slate and other impurities. The purified coal overflows into a drainage box, in which it is collected and dried. The fine material passing down through the sieves is collected, and is either re-treated or wasted, depending upon its composition. Each of the tests was made on a lot of between three and four tons; which was first crushed, then sized, and then jigged in three separate portions—coarse, intermediate, and small—in order to achieve the most accurate results. The very fine coal was also treated when the coal was suitable for coking, or when, for any reason, there was likely to be

a commercial justification for saving the fines. The products both of coal and waste were all recovered, weighed, and sampled; but the coarse and fine products were mixed before sending them to the boilers.

The coal washing work was checked by a further series of tests with heavy solutions. It would, of course, be possible in a laboratory to do extremely thorough washing at an expense disproportionate to the value of the coal; but this was not attempted, the aim being to reproduce commercial conditions. From comparative tests made between laboratory work, and coal washing in standard plants, it is evident that this end was attained, and the tests as carried on may be taken in a broad way to represent average commercial work.

The whole subject of coal washing as well as testing is dealt with in Vol. I, Part V, and the results of all of the trials are presented in a series of summary tables. The detailed results of each test are given in the present volume and are followed by the summary tables reprinted from Volume I.

### *Coking Trials.*

Coke, as ordinarily manufactured in beehive ovens, can only be produced from bituminous coals possessing particular qualities, but when retort ovens are employed a larger range of coals are available, although even at best there are many coals from which good coke cannot be produced.

Several series of trials were made to test the coking qualities of the various coals in both types of ovens, and also to determine upon a reliable method of producing coke from small quantities of coal, and a method of comparing different cokes in respect of their strength, porosity, etc.

These experiments are described in detail and their results summarized in Vol. I, Part VI, but additional matter relating to special methods of testing, etc., will be found in Vol. VI, Appendix IV.

### *Boiler Trials.*

The boiler trials were conducted in the boiler testing room of the University, the method used being as far as possible in accordance with standard practice.

The boiler, which is a Babcock and Wilcox, rated at 60 H.P., was thoroughly cleaned and tested before the trials were commenced, and standardizing tests were run with Georges Creek coal. The series included 72 trials, each of which lasted at least ten hours.

The methods employed in conducting the trials are fully detailed in Vol. II, Part VII, and this Part also contains a general discussion of the use of coal for steam raising, and a tabular summary of the whole series of trials.

Full notes of each of these trials are published in Vol. IV, Appendix II, followed by the summary record above referred to reprinted from Vol. II.

### *Producer Trials.*

The producer trials were made in a special laboratory erected and equipped for the purpose at McGill University. Several producers were tested, but the standard trials were carried out in a special down-draught producer rated at 40 H.P.

The trials lasted at least 24 hours, and were checked by longer runs —one of 10 days.

The methods employed in conducting the trials are fully set forth in Vol. II, Part VIII, and a summary of the results of the trials is presented in tabular form. This Part also contains a discussion of general questions of the use of producers and gas engines for the generation of power. The detailed results of the trials are contained in Vol. V, Appendix III.

### *Chemical Work.*

The chemical laboratory of the Mining Department at McGill University was given over exclusively to the work of the tests for more than three years. Standard methods of analysis were used as far as possible, and these, together with a number of important special methods, are fully described in Vol. II, Part IX. A summary statement of the analyses of all of the regular samples appears at the end of the same part. Details of the less important analytic work, and accounts and records of a large amount of secondary work, are given in Vol. VI, Appendix V.

## THE REPORT.

It will be seen from the above description of the investigation, that an attempt has been made to cover a large field, and yet to do the work in great detail. As a result of this, a very large amount of information has been gathered; but much of it is so highly technical as to be only of interest to specialists, hence it has been thought best to divide the Report—which comprises six volumes—into two main sections: of two and four volumes respectively.

In the first section there are separate chapters, or parts, dealing with each of the seven divisions of the investigation outlined in the last few pages. Each of these parts begins with an introduction in which the subject of the division is dealt with in a general way, followed by a more or less extended description and discussion of the experimental work attempted; and concluding with a carefully tabulated summary of all of the tests in that division.

Preceding the technical reports referred to above there are two important chapters, the first being an introduction dealing with the investigation as a whole, and the second being a very full descriptive paper on the history, geology, and present commercial development of the coal fields and coal mines of Canada, from the pen of Mr. Theo. C. Denis—

a member of the permanent staff of the Mines Branch of the Department of Mines. This part of the Report, which is profusely illustrated with maps and photographs, differs from the remainder in that its matter is largely drawn from previous publications of the Geological Survey and other sources, but it possesses great value as an introduction to the somewhat technical reports which follow, and is of importance, on its own account, as the most complete single work yet written on the coal fields of the Dominion.

The first two volumes of the Report, comprising Parts I to IX inclusive, may, therefore, be considered as complete in themselves, and it is hoped that they will prove of value not only as contributions to the technological literature on coal, but also as a source of useful and timely information to the general public, on the coal resources of the Dominion and on the best methods of utilizing these resources.

The remaining four volumes, III, IV, V, and VI, are given up exclusively to tabulated records and details of the tests summarized in Volumes I and II, to which they thus become highly technical appendices.

# DETAILED RECORDS OF THE WASHING TRIALS, ARRANGED IN THE ORDER OF THE GEOGRAPHICAL OCCURRENCE OF THE SAMPLES.

## SYDNEY COAL FIELD.

### CAPE BRETON CO., NOVA SCOTIA.

ERRATUM

On the curve diagrams accompanying the tabulated records of each of the coals tested, is the following legend:—

LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " material floating at the several densities.

The above legend is incorrect; in each case it should read thus:—

○ Curve showing the relative quantities of the several sizes.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " material floating at the several densities.
△ " " " " " ash in " " " " " "

## COAL.—No. 50.

*Locality.*—Port Morien, Cape Breton, N.S.

*Colliery.*—North Atlantic collieries.

*Sample.*—This mine was closed at the time the car load samples were taken, but was opened later and a sample of 200 pounds was then taken by Mr. Stansfield, the coal being from the Gowrie seam. The sample was taken after the coal had been cleaned over a $\frac{3}{4}''$ wire shaking screen and had been hand picked. The Blockhouse seam was not then being mined.

### TABLE A.

### Specific Gravity Tests.

| Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|
| 1. 1·550 | 82·8 | 5·5 | 17·2 | 45·0 |
| 2. 1·426 | 71·6 | 4·3 | 28·4 | 35·1 |
| 3. 1·375 | 62·8 | 3·4 | 37·2 | 28·7 |
| 4. 1·330 | 47·7 | 2·5 | 52·3 | 23·8 |

The following results are obtained from the above data, and the chemists reports:—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 62·8 | % ash | 3·4 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 20·0 | " " | 12·1 |
| 7. | Useful coal—sum of (5) and (6) | " " | 82·8 | " " | 5·5 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 17·2 | " " | 48·6 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 12·3 |
| 10. | " " " " " " | | | % sulphur | 6·4 |
| 11. | " " " " " " | | | Fuel Ratio | 1·53 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—The coal has a moderate amount of innate ash and a fairly large amount of bone somewhat high in ash. The refuse is considerable in amount, with a medium proportion in ash. The coal would be considerably improved by washing, but owing to the delay in taking the sample and the small quantity obtained no tests were made other than those with the heavy solutions above summarized.

TABLE B.

## Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample. | % Ash in size. |
|---|---|---|---|---|---|
| 13. | .... | .... | .... | .... | .... |
| 14. | .... | .... | .... | .... | .... |
| 15. | .... | .... | .... | .... | .... |
| 16. | .... | .... | .... | .... | .... |
| 17. | .... | .... | .... | .... | .... |
| 18. | .... | .... | .... | .... | .... |

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal............... | This coal was not washed. | | | | | |
| 20. Washed coal............... | | | | | | |
| 21. Refuse—coarse............. | | | | | | |
| 22. Hutch product............. | | | | | | |
| 23. Jig slimes ................. | | | | | | |
| 24. Table slimes............... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. Original coal ...................... | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. Washed coal....................... | " " | .... | " " | .... | " " | .... |
| 27. Refuse............................ | " " | .... | " " | .... | " " | .... |
| 28. Other products.................... | " " | .... | " " | .... | " " | .... |
| 29. Loss.............................. | " " | .... | " " | .... | " " | .... |
| 30. Loss in % | | | | | | |

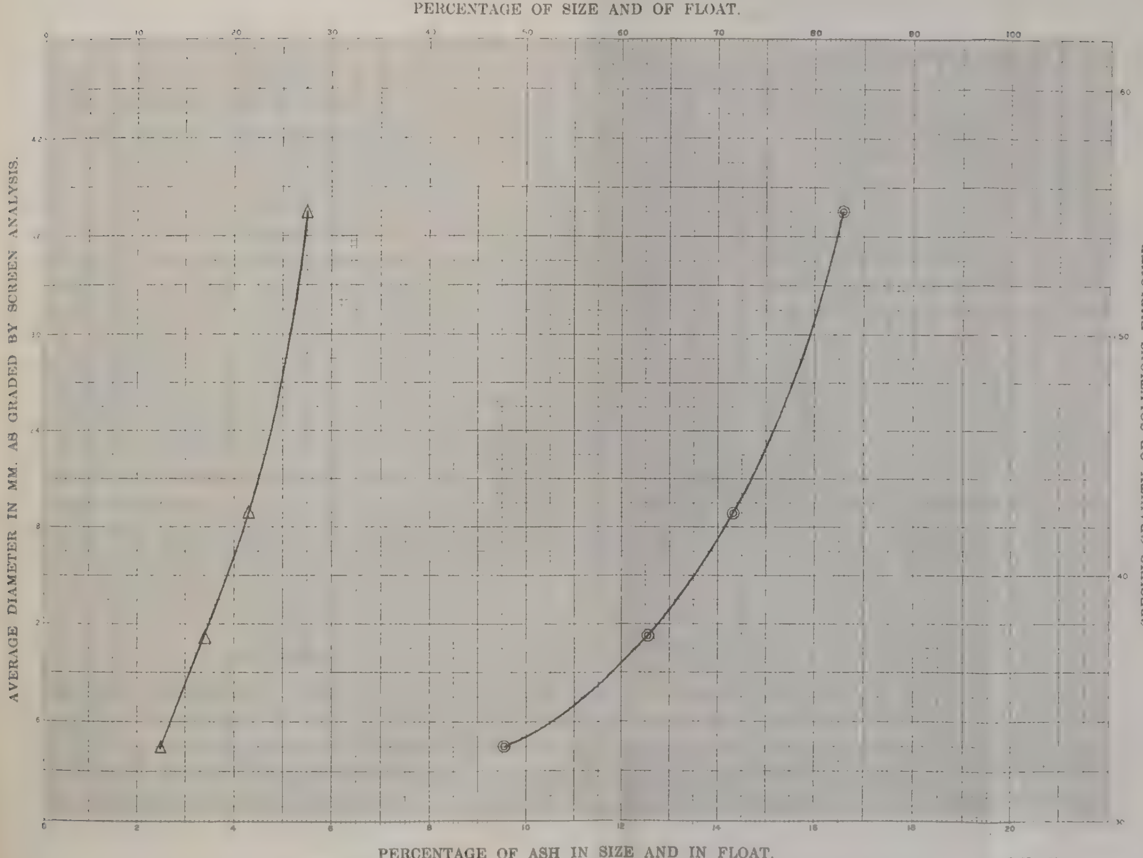
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone.... | % | .... | Ratio to standard | .... |
| 32. Reduction in ash.............................. | % | .... | " " | .... |
| 33. " " sulphur.................................. | % | .... | " " | .... |
| 34. Increase in calorific value—calorimeter ......... | % | .... | | |
| 35. Increase in evaporation under boiler............ | % | .... | | |
| 36. Decrease in clinker under boiler................ | % | .... | | |
| 37. Fuel ratio of original coal..................... | | .... | | |
| 38. " " washed " ..................... | | .... | | |
| 39. Calorific value of original coal................. | | .... | | |
| 40. " " washed " ................. | | .... | | |

*Remarks on Tables B, C, D, and E.*—It was not considered necessary to wash this sample.

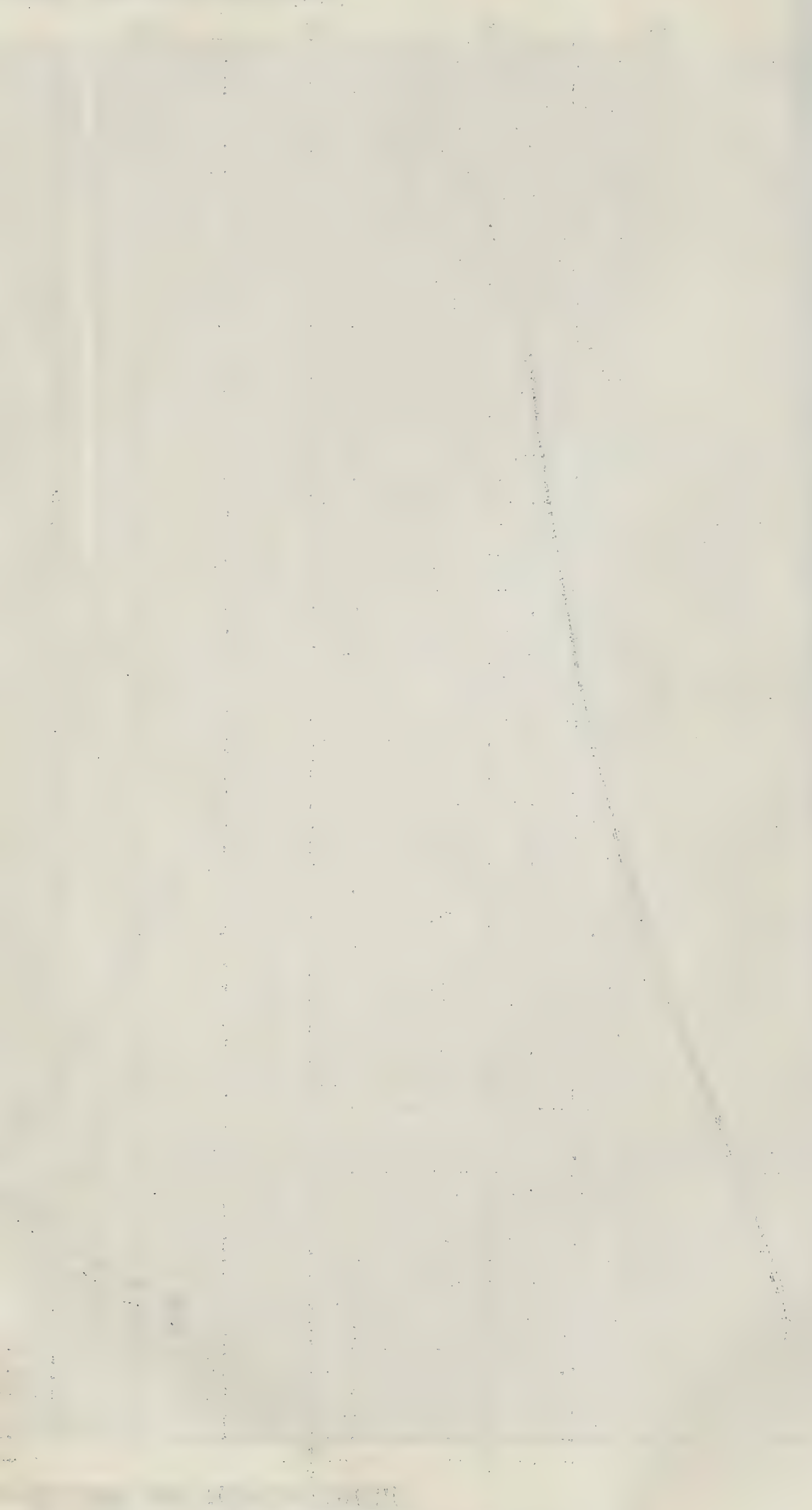
# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " densities
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " material floating at the several densities.

COAL No. 50
APPENDIX I, VOL. III



## COAL.—No. 36.

*Locality.*—Glace Bay, C.B., N.S.

*Colliery.*—Dominion Coal Co. No. 7 or Hub.

*Sample.*—One hundred and twenty-five bags from the Hub seam. The sample was lump coal from the submarine areas, and had all passed over a $2\frac{1}{2}''$ shaking screen and then a picking table. Sampled June 24, 1908.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·530 | 93·7 | 2·4 | 6·3 | 58·0 |
| 2. | 1·405 | 91·4 | 2·2 | 8·6 | 46·5 |
| 3. | 1·360 | 89·0 | 1·7 | 11·0 | 40·0 |
| 4. | 1·330 | 81·2 | 1·5 | 18·8 | 25·0 |

The following results are obtained from the above data, and the chemists reports:—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 90·5 | % ash | 1·9 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 3·5 | " " | 13·8 |
| 7. | Useful coal—sum of (5) and (6) | " " | 94·0 | " " | 2·4 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 6·0 | " " | 60·9 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 5·9 |
| 10. | " " " " " " | | | % sulphur | 2·4 |
| 11. | " " " " " " | | | Fuel Ratio | 1·58 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 1·53 |

*Remarks.*—The coal contains very little innate ash, and unusually small quantities of bone and refuse, the former low and the latter very high in ash. The coal is an ideal one for washing so far as improvement in ash is concerned, and the sulphur would also be considerably reduced. The total amount of ash is, however, so low as to render washing commercially unnecessary.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 33·2 | 8·1 |
| 14. | 3·16 | 1·20 | 2·18 | 21·6 | 6·8 |
| 15. | 1·20 | 0·64 | 0·92 | 15·4 | 4·9 |
| 16. | 0·64 | 0·30 | 0·47 | 10·1 | 5·2 |
| 17. | 0·30 | 0·173 | 0·24 | 10·1 | 5·3 |
| 18. | 0·173 | 0·000 | 0·086 | 9·6 | 5·8 |

*Remarks.*—This coal is more friable than samples from the deeper seams of the vicinity, unless, perhaps, from the Phalen seam at Dominion No. 1. The main portion of the refuse seems to be less friable than the coal.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal........ | 2533 | 6·3 | 1766 | 7·0 | 1121 | 5·2 |
| 20. | Washed coal........ | 2366 | 2·9 | 1644 | 2·4 | 996 | 2·7 |
| 21. | Refuse—coarse..... | 152 | 59·2 | 76 | 50·3 | 52 | 47·0 |
| 22. | Hutch product...... | 17 | 25·7 | 14 | 31·6 | .... | .... |
| 23. | Jig slimes.......... | .... | .... | 12 | 20·0 | .... | .... |
| 24. | Table slimes........ | .... | .... | .... | .... | 5 | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal...................... | wt. in lbs. | 5420 | % ash | 5·9 | % sulphur | 2·4 |
| 26. | Washed coal...................... | " " | 5006 | " " | 2·7 | " " | 2·0 |
| 27. | Refuse.............................. | " " | 280 | " " | 54·0 | " " | .... |
| 28. | Other products.................... | " " | 92 | " " | .... | " " | .... |
| 29. | Loss................................ | " " | 42 | " " | .... | " " | .... |
| 30. | Loss in % 0·8. | | | | | | |

TABLE E.

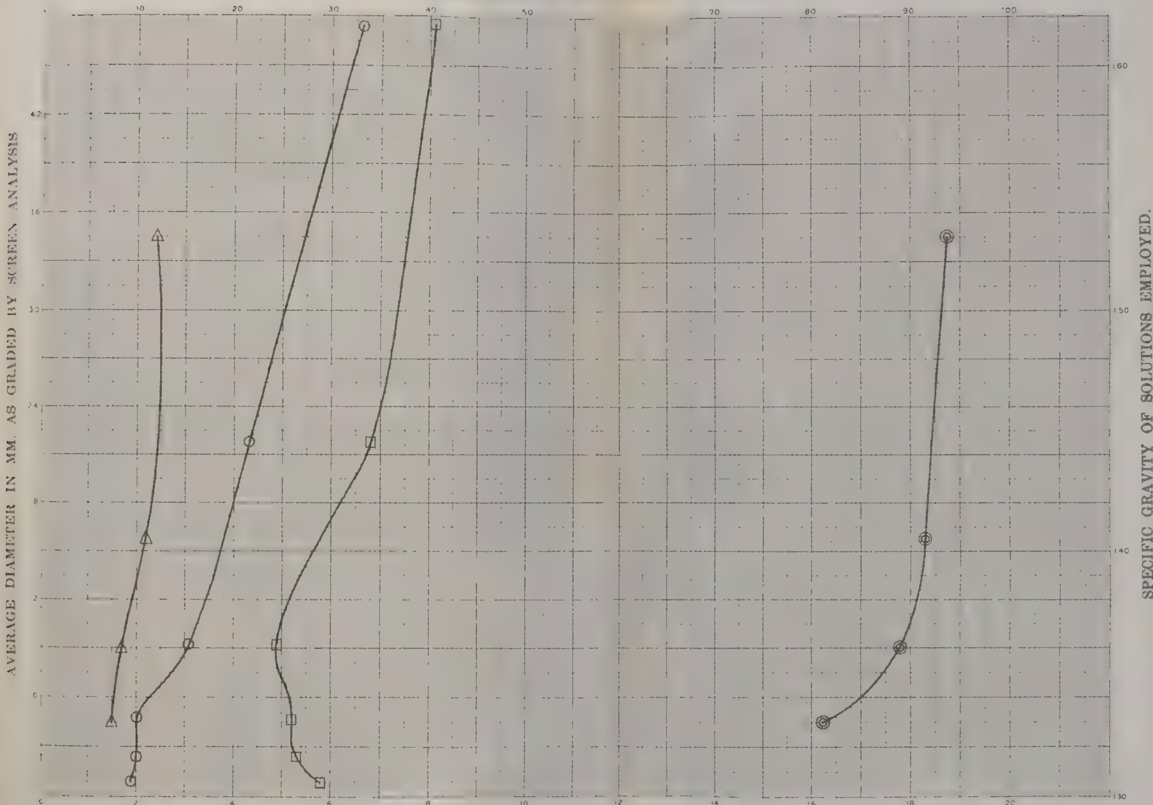
## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone......% | 92·5 | Ratio to standard | 98·4 |
| 32. | Reduction in ash.............................% | 54·3 | " " | 88·9 |
| 33. | " " sulphur..........................% | 16·7 | " " | 80·0 |
| 34. | Increase in calorific value—calorimeter...........% | 3·2 | | |
| 35. | Increase in evaporation under boiler.............% | 5·6 | | |
| 36. | Decrease in clinker under boiler.................% | 60·9 | | |
| 37. | Fuel ratio of original coal ........................ | 1·58 | | |
| 38. | " " washed " ........................ | 1·55 | | |
| 39. | Calorific value of original coal .................... | 7700 | | |
| 40. | " " washed " .................... | 7950 | | |

*Remarks on Tables C, D, and E.*—This washing trial was thoroughly successful, and increased the evaporative power and decreased clinker in a satisfactory way. It is improbable, however, that washing would be commercially desirable for lump coal; although it might be profitable for screenings.

# GRAPHIC RECORD OF SIZING AN IFIC GRAVITY TESTS.

PERCENTAGE OF SIZ. FLOAT.




PERCENTAGE OF ASH IN SIZE AND IN FLOAT.

COAL No. 36
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
⊚ " " " " " " " material floating at the several densities.

## COAL.—No. 35.

*Locality.*—Glace Bay, C.B., N.S.

*Colliery.*—Dominion Coal Co. No. 9, Harbour seam.

*Sample.*—Sample of sixty-five sacks of lump coal, which had been passed over a $2\frac{1}{2}''$ bar screen and then hand picked. Coal from this seam is used chiefly as domestic fuel. Sampled June 23, 1908.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·530 | 91·9 | 3·0 | 8·1 | 47·7 |
| 2. | 1·450 | 88·8 | 2·9 | 11·2 | 39·3 |
| 3. | 1·370 | 86·3 | 2·8 | 13·7 | 32·1 |
| 4. | 1·330 | 82·5 | 2·1 | 17·5 | 28·9 |

The following results are obtained from the above data, and the chemists reports :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 86·5 | % ash | 2·8 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 6·5 | " " | 6·1 |
| 7. | Useful coal—sum of (5) and (6) | " " | 93·0 | " " | 3·0 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 7·0 | " " | 50·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 5·9 |
| 10. | " " " " " " | | | % sulphur | 3·7 |
| 11. | " " " " " " | | | Fuel Ratio | 1·44 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 1·52 |

*Remarks.*—This coal contains comparatively little ash, and comparatively small quantities of bone and refuse, the former low in ash. The coal can be improved by washing, but it is already good enough as it stands. The screenings were not sampled, but it is probable that they contain more refuse, and, therefore, would be considerably improved by washing.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 50·4 | 6·4 |
| 14. | 3·16 | 1·20 | 2·18 | 15·7 | 5·6 |
| 15. | 1·20 | 0·64 | 0·92 | 11·5 | 5·9 |
| 16. | 0·64 | 0·30 | 0·47 | 8·3 | 6·8 |
| 17. | 0·30 | 0·173 | 0·24 | 8·5 | 8·5 |
| 18. | 0·173 | 0·000 | 0·086 | 5·6 | 12·7 |

*Remarks.*—This coal is only moderately strong and the small amount of ash is largely due to the fact that the sample consisted entirely of lump. The ash-bearing material is, on the whole, more friable than the purer coal.

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. Original coal ... | | | | | | | |
| 20. Washed coal.... | | | | | | | |
| 21. Refuse—coarse.. | Not washed. | | | | | | |
| 22. Hutch product.. | | | | | | | |
| 23. Jig slimes...... | | | | | | | |
| 24. Table slimes.... | | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | |
|---|---|---|---|---|---|---|
| 25. Original coal ........................ | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. Washed coal........................ | " " | .... | " " | .... | " " | .... |
| 27. Refuse............................ | " " | .... | " " | .... | " " | .... |
| 28. Other products..................... | " " | .... | " " | .... | " " | .... |
| 29. Loss.............................. | | .... | | .... | | .... |
| 30. Loss in % .... | | | | | | |

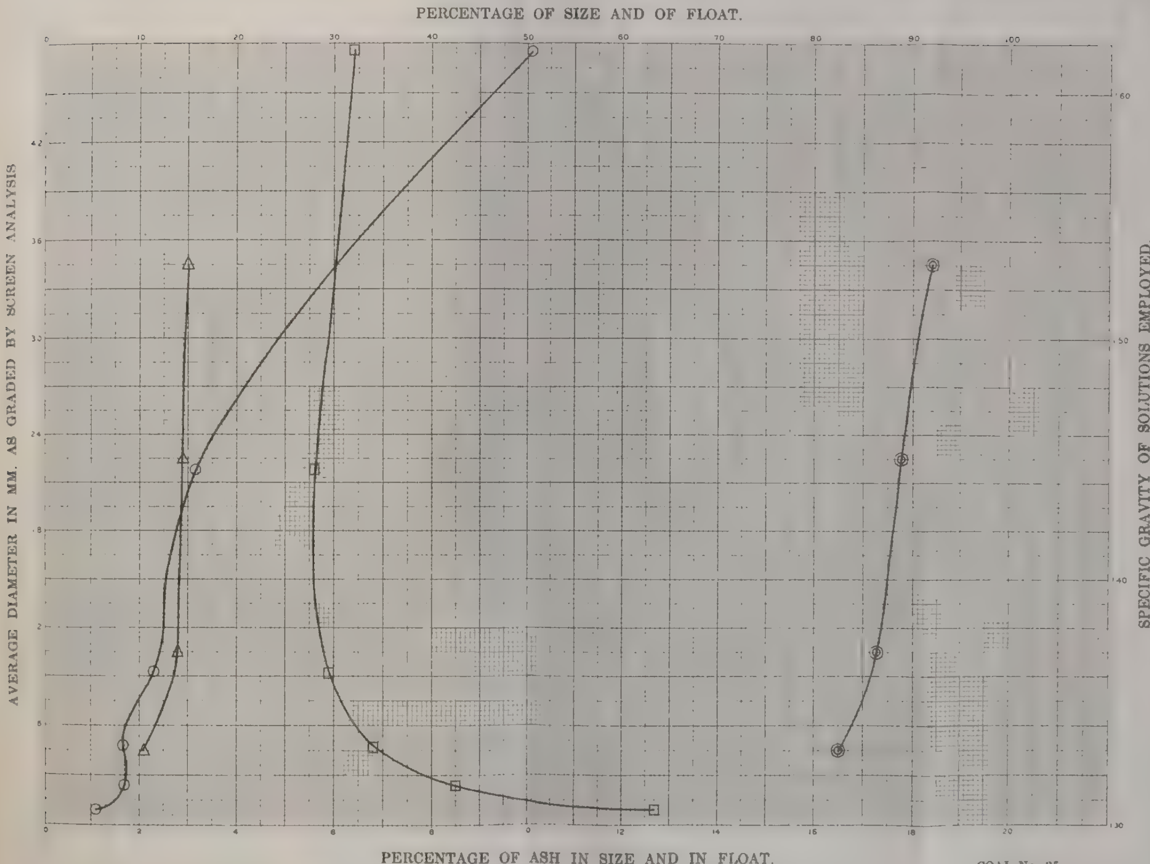
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone ... | % | .... | Ratio to standard | .... |
| 32. Reduction in ash.......................... | % | .... | " " | .... |
| 33. " " sulphur........................ | % | .... | " " | .... |
| 34. Increase in calorific value—calorimeter........ | % | .... | | |
| 35. Increase in evaporation under boiler............ | % | .... | | |
| 36. Decrease in clinker under boiler................ | % | .... | | |
| 37. Fuel ratio of original coal...................... | | | | |
| 38. " " washed " .................. | | | | |
| 39. Calorific value of original coal.................. | | | | |
| 40. " " washed " ................. | | | | |

*Remarks on Tables C, D, and E.*—Owing to the small amount of ash in this coal, and to the fact that the sulphur could not be largely reduced, the sample was not washed on a large scale.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " ". percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. 35
APPENDIX I, VOL. III

## COAL.—No. 35 SP.

*Locality.*—Reserve, C.B., N.S.

*Colliery.*—Dominion Coal Co. No. 5, or Reserve colliery, on Phalen seam.

*Sample.*—A small sample of twenty-five sacks of lump coal which had been screened over $1\frac{1}{2}''$ and then hand picked.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·520 | 96·0 | 3·4 | 4·0 | 56·5 |
| 2. | 1·415 | 92·2 | 3·0 | 7·8 | 32·6 |
| 3. | 1·370 | 90·1 | 2·7 | 10·0 | 30·3 |
| 4. | 1·340 | 88·6 | 2·7 | 11·4 | 26·3 |

The following results are obtained from the above data and the chemists reports :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 90·5 | % ash | 2·7 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 7·5 | " " | 12·5 |
| 7. | Useful coal—sum of (5) and (6) | " " | 98·0 | " " | 3·0 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 2·0 | " " | 66·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 5·5 |
| 10. | " " " " " " | | | % sulphur | 1·8 |
| 11. | " " " " " " | | | Fuel Ratio | 1·70 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 1·63 |

*Remarks.*—The innate ash is low, and the bone and refuse are also low in quantity, the former with little ash and the latter with high ash. Washing would considerably reduce the amount of ash, and would improve the coal in the matter of sulphur, but it is unnecessary, as the coal is already good enough. It is possible that the screenings could be washed with advantage.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 52·7 | 5·0 |
| 14. | 3·16 | 1·20 | 2·18 | 20·1 | 5·0 |
| 15. | 1·20 | 0·64 | 0·92 | 12·6 | 4·7 |
| 16. | 0·64 | 0·30 | 0·47 | 6·4 | 4·8 |
| 17. | 0·30 | 0·173 | 0·24 | 5·0 | 6·7 |
| 18. | 0·173 | 0·000 | 0·086 | 3·4 | 6·8 |

*Remarks.*—The coal is fairly strong, and stands shipment and crushing well, making but a small amount of fines. It is probable that there are two ash-bearing materials, one more friable, and the other less friable than the coal itself. As a result, the average amount of ash in all sizes is approximately constant.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal . . . | Not washed. | | | | | |
| 20. | Washed coal. . . . | | | | | | |
| 21. | Refuse—coarse. . | | | | | | |
| 22. | Hutch product. . | | | | | | |
| 23. | Jig slimes. . . . . . | | | | | | |
| 24. | Table slimes. . . . | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | |
|---|---|---|---|---|
| 25. | Original coal . . . . . . . . . . . . . . . . . . . . . . . . . wt. in lbs. | % ash . . . . | % sulphur . . . . |
| 26. | Washed coal. . . . . . . . . . . . . . . . . . . . . . . . . " " | " " . . . . | " " . . . . |
| 27. | Refuse. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . " " | " " . . . . | " " . . . . |
| 28. | Other products. . . . . . . . . . . . . . . . . . . . . . . " " | " " . . . . | " " . . . . |
| 29. | Loss. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | . . . . | . . . . |
| 30. | Loss in % | | |

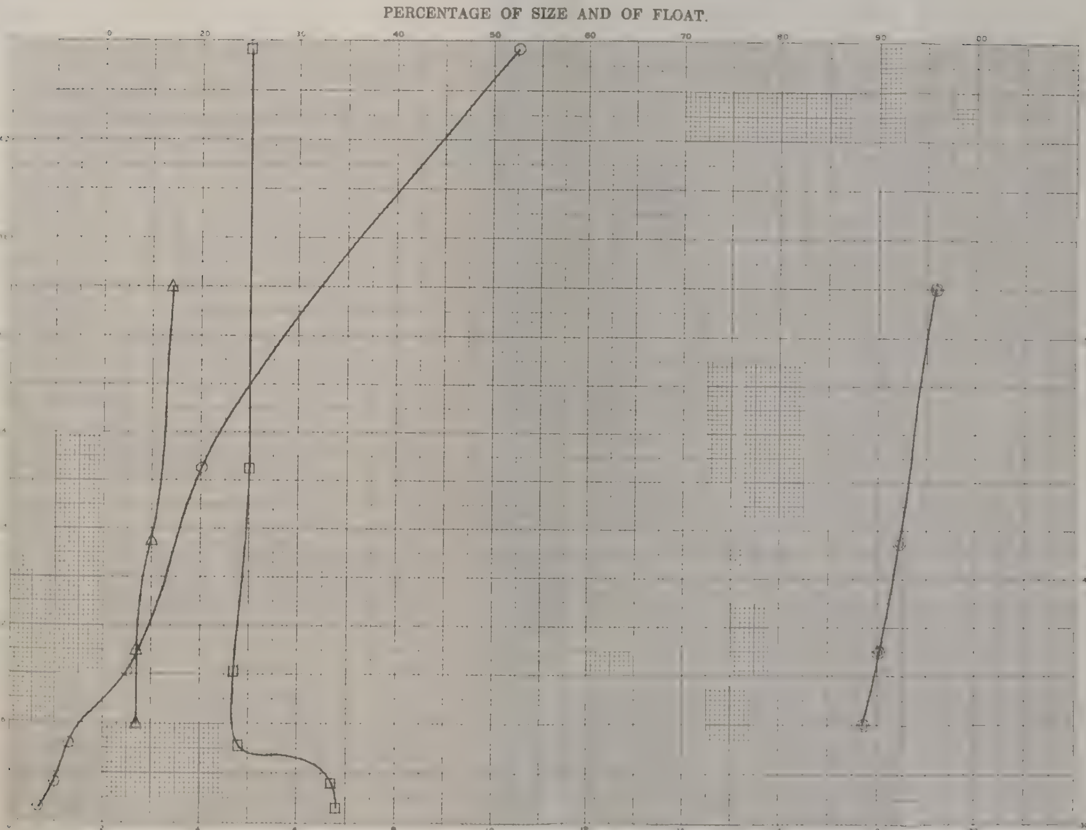
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | |
|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. . % . . . . | Ratio to standard . . . . |
| 32. | Reduction in ash . . . . . . . . . . . . . . . . . . . . . . . . . % . . . . | " " . . . . |
| 33. | " " sulphur. . . . . . . . . . . . . . . . . . . . . . . . % . . . . | " " . . . . |
| 34. | Increase in calorific value—calorimeter . . . . . . . . . % . . . . | |
| 35. | Increase in evaporation under boiler. . . . . . . . . . . % . . . . | |
| 36. | Decrease in clinker under boiler. . . . . . . . . . . . . . . % . . . . | |
| 37. | Fuel ratio of original coal. . . . . . . . . . . . . . . . . . . . | |
| 38. | " " washed " . . . . . . . . . . . . . . . . . . . . | |
| 39. | Calorific value of original coal. . . . . . . . . . . . . . . . . | |
| 40 | " " washed " . . . . . . . . . . . . . . . . . | |

*Remarks on Tables C, D, and E.*—It was not considered necessary to wash this sample.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

- Curve showing the relative quantities of the several sizes.
- △ " " " " " " " " densities.
- □ " " " percentage of ash in each of the several sizes.
- O " " " " " " " material floating at the several densities

COAL No. 35 S.P
APPENDIX I, VOL. III

## COAL.—No. 38.

*Locality.*—Dominion, C.B., N.S.

*Colliery.*—Dominion Coal Co., Dominion Mine No. 1, Phalen seam.

*Sample.*—One hundred and twenty-five sacks of coal which had been screened over 1″ and then hand picked. Sampled June 26, 1908.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·525 | 93·5 | 3·5 | 6·5 | 44·2 |
| 2. | 1·450 | 91·6 | 3·4 | 8·4 | 34·6 |
| 3. | 1·360 | 86·9 | 2·4 | 13·1 | 28·5 |
| 4. | 1·310 | 71·6 | 1·6 | 28·1 | 18·3 |

The following results are obtained from the above data and the chemists reports :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 88·3 | % ash | 2·6 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 5·2 | " " | 18·2 |
| 7. | Useful coal—sum of (5) and (6) | " " | 93·5 | " " | 3·5 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 6·5 | " " | 48·3 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 5·9 |
| 10. | " " " " " " | | | % sulphur | 1·9 |
| 11. | " " " " " " | | | Fuel Ratio | 1·74 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 1·65 |

*Remarks.*—This coal is from the same seam as sample No. 35 SP, and the mines are adjoining. The only considerable difference between the coals is that the refuse contains much less ash. Washing would considerably reduce the ash, but is unnecessary, particularly as the sulphur cannot be considerably reduced.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 27·0 | 8·4 |
| 14. | 3·16 | 1·20 | 2·18 | 25·0 | 5·7 |
| 15. | 1·20 | 0·64 | 0·92 | 18·3 | 5·2 |
| 16. | 0·64 | 0·30 | 0·47 | 10·7 | 4·9 |
| 17. | 0·30 | 0·173 | 0·24 | 8·9 | 5·1 |
| 18. | 0·173 | 0·000 | 0·086 | 10·1 | 8·0 |

*Remarks.*—There is a considerable amount of fine coal as compared with the other samples from the district, but this is partly due to the fact

that the sample had been passed over a much smaller screen than in most of the other Dominion Company coals. The coal seems more friable than other samples from the district, except that from the Hub seam, No. 36.

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal ... | Not washed. | | | | | |
| 20. Washed coal.... | | | | | | |
| 21. Refuse—coarse... | | | | | | |
| 22. Hutch product.. | | | | | | |
| 23. Jig slimes. ..... | | | | | | |
| 24. Table slimes.... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | |
|---|---|---|---|---|---|---|
| 25. Original coal ........................ | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. Washed coal........................ | " " | .... | " " | .... | " " | .... |
| 27. Refuse............................ | " " | .... | " " | .... | " " | .... |
| 28. Other products...................... | " " | .... | " " | .... | " " | .... |
| 29. Loss............................ | " " | .... | " " | .... | " " | .... |
| 30. Loss in % .... | | | | | | |

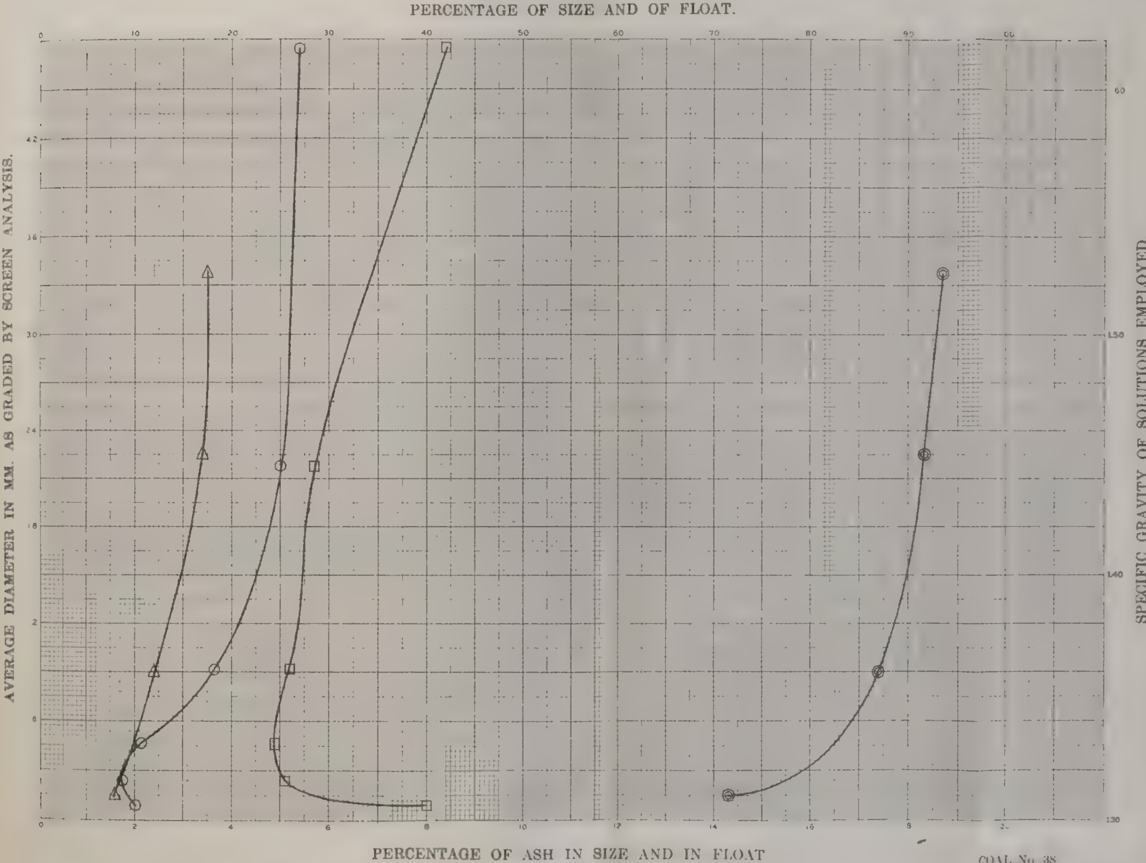
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone. .. | % | .... | Ratio to standard | .... |
| 32. Reduction in ash............................ | % | .... | " " | .... |
| 33. " " sulphur.......................... | % | .... | " " | .... |
| 34. Increase in calorific value—calorimeter ......... | % | .... | | |
| 35. Increase in evaporation under boiler............ | % | .... | | |
| 36. Decrease in clinker under boiler................ | % | .... | | |
| 37. Fuel ratio of original coal...................... | | | | |
| 38. " " washed " ...................... | | | | |
| 39. Calorific value of original coal.................. | | | | |
| 40. " " washed " ................. | | | | |

*Remarks on Tables C, D, and E.*—It was not considered necessary to wash this sample.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 38
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities

## COAL.—No. 37.

*Locality.*—Reserve, C.B., N.S.

*Colliery.*—Dominion Coal Co., No. 10 mine, Emery seam.

*Sample.*—Sample of one hundred and twenty-five sacks of unscreened run of mine, which, however, had been hand picked. Sampled June 25, 1908.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·526 | 86·7 | 5·1 | 13·7 | 58·1 |
| 2. | 1·400 | 81·1 | 4·0 | 18·9 | 45·2 |
| 3. | 1·360 | 73·9 | 3·2 | 26·1 | 35·2 |
| 4. | 1·325 | 57·4 | 2·4 | 42·6 | 23·5 |

The following results are obtained from the above data and the chemists reports :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 77·5 | % ash | 3·5 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 9·5 | " " | 18·1 |
| 7. | Useful coal—sum of (5) and (6) | " " | 87·0 | " " | 5·2 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 13·0 | " " | 60·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 11·1 |
| 10. | " " " " " " | | | % sulphur | 2·5 |
| 11. | " " " " " " | | | Fuel Ratio | 1·53 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 1·43 |

*Remarks.*—The innate ash is higher than in any other of the coals of the neighbourhood. There are, also, large proportions of bone and refuse, the latter, particularly, being high in ash. The coal could be largely improved by washing.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 50·1 | 11·8 |
| 14. | 3·16 | 1·20 | 2·18 | 17·9 | 11·6 |
| 15. | 1·20 | 0·64 | 0·92 | 11·5 | 11·3 |
| 16. | 0·64 | 0·30 | 0·47 | 7·3 | 10·3 |
| 17. | 0·30 | 0·173 | 0·24 | 6·3 | 9·7 |
| 18. | 0·173 | 0·000 | 0·086 | 6·9 | 9·9 |

*Remarks.*—The coal is not friable, and the proportion of fines in the sample is quite moderate in view of the fact that the sample itself was run of mine. The refuse is less friable than the coal.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal | 3170 | 10·2 | 1757 | 9·1 | 1214 | .... |
| 20. | Washed coal | 2790 | 5·6 | 1566 | 5·4 | 973 | .... |
| 21. | Refuse—coarse | 348 | 46·6 | 174 | 46·0 | 113 | .... |
| 22. | Hutch product | 24 | 46·9 | 8 | 63·4 | .... | .... |
| 23. | Jig slimes | .... | .... | 17 | 19·1 | .... | .... |
| 24. | Table slimes | .... | .... | .... | .... | 105 | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 25. | Original coal | wt. in lbs. | 6141 | % ash | 11·1 | % sulphur | 2·5 |
| 26. | Washed coal | " " | 5434 | " " | 5·8 | " " | 2·1 |
| 27. | Refuse | " " | 635 | " " | 47·0 | " " | .... |
| 28. | Other products | " " | 73 | " " | .... | " " | .... |
| 29. | Loss | " " | 0 | " " | .... | " " | .... |

30. Loss in % 0·0.

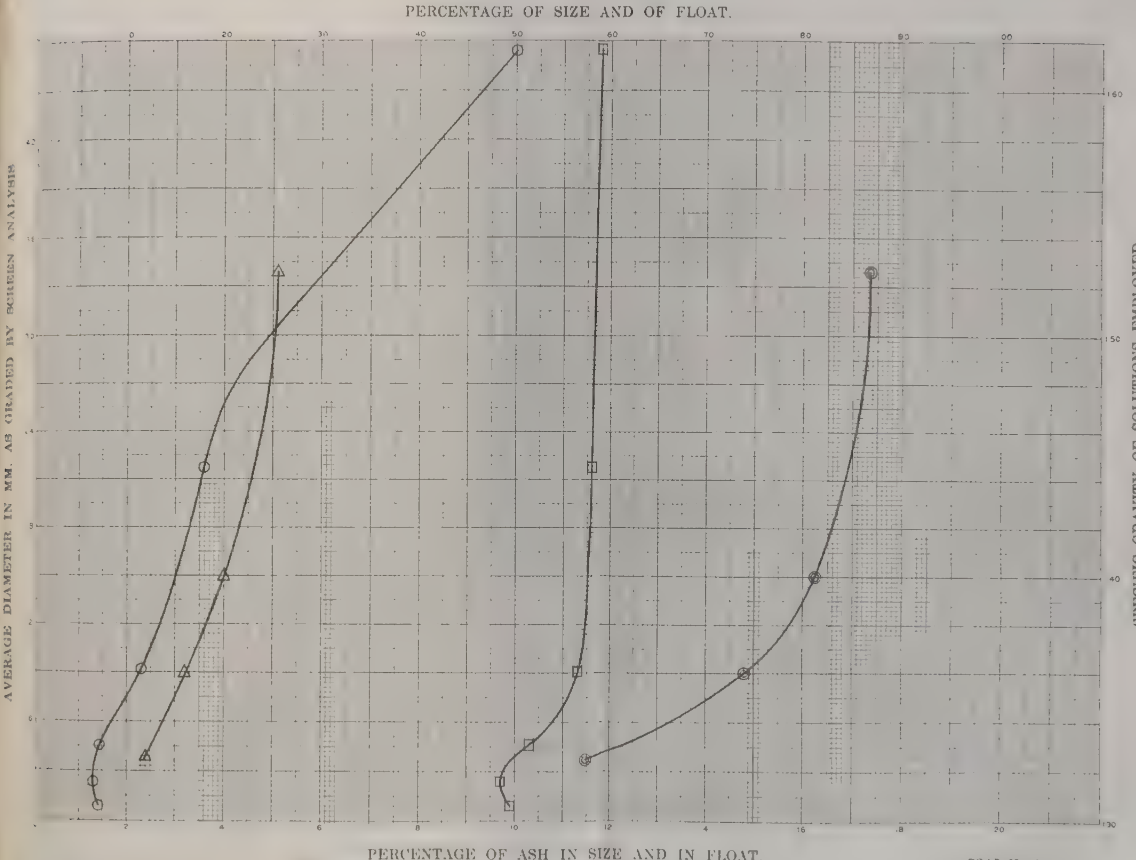
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone....% | 88·5 | Ratio to standard | 101·8 |
| 32. | Reduction in ash....% | 47·8 | " " | 89·6 |
| 33. | " " sulphur....% | 16·0 | " " | 57·1 |
| 34. | Increase in calorific value—calorimeter....% | 5·7 | | |
| 35. | Increase in evaporation under boiler....% | 5·8 | | |
| 36. | Decrease in clinker under boiler....% | 52·2 | | |
| 37. | Fuel ratio of original coal.... | 1·53 | | |
| 38. | " " washed " .... | 1·55 | | |
| 39. | Calorific value of original coal.... | 7290 | | |
| 40. | " " washed " .... | 7710 | | |

*Remarks on Tables C, D, and E.*—The trial was thoroughly successful as far as reduction in ash is concerned. The recovery is also good. The reduction in sulphur should have been better, and no doubt would be in a commercial washery, the product of which also should be even better than the trial in respect to the ash and recovery.

## GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 37
APPENDIX I, VOL. III

LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes
△ " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities

## COAL.—No. 39.

*Locality.*—Lingan, N.S.

*Colliery.*—Dominion Coal Co. No. 12 mine, Lingan seam.

*Sample.*—This seam was being developed at the time it was sampled, and twenty-five sacks only were filled from a pile which had been drawn from the slope a few hours previously. There was no deliberate hand picking, but the larger lumps of refuse may have been thrown out underground. Sampled June 27, 1908. The mine has since been fully developed and is now producing a considerable tonnage.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·540............. | 94·5 | 2·3 | 5·5 | 49·1 |
| 2. | 1·420............. | 93·1 | 2·2 | 6·9 | 42·1 |
| 3. | 1·370............. | 90·8 | 2·2 | 9·2 | 30·4 |
| 4. | 1·330............. | 87·0 | 1·5 | 13·0 | 22·4 |

The following results are obtained from the above data, and the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375...................... | % yield | 91·0 | % ash | 2·2 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55..................... | " " | 3·0 | " " | 5·0 |
| 7. | Useful coal—sum of (5) and (6)..................... | " " | 94·0 | " " | 2·3 |
| 8. | Refuse, Sp. Gr. over 1·55.......................... | " " | 6·0 | " " | 50·0 |
| 9. | Assay of original sample raw coal as sent to chemist.............. | | | " " | 4·8 |
| 10. | " " " " " " .............. | | | % sulphur | 1·8 |
| 11. | " " " " " " .............. | | | Fuel Ratio | 1·55 |
| 12. | Assay of mixed good and bone coal (5) and (6).................. | | | " " | 1·44 |

*Remarks.*—This coal carries a comparatively small amount of innate ash, and is also low in refuse, which itself is low in ash. As the sample is equivalent to unscreened, and almost unpicked run of mine, the ash may be considered very low for the district. The coal could be improved by washing, but this treatment is unnecessary under present conditions.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 61·9 | 4·5 |
| 14. | 3·16 | 1·20 | 2·18 | 18·4 | 3·7 |
| 15. | 1·20 | 0·64 | 0·92 | 9·3 | 4·6 |
| 16. | 0·64 | 0·30 | 0·47 | 4·8 | 5·0 |
| 17. | 0·30 | 0·173 | 0·24 | 3·4 | 5·0 |
| 18. | 0·173 | 0·000 | 0·086 | 2·2 | 9·4 |

*Remarks.*—The coal makes very little fines, and is apparently less friable than any other coal from the district.

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. Original coal ... | Not washed. | | | | | | |
| 20. Washed coal.... | | | | | | | |
| 21. Refuse—coarse.. | | | | | | | |
| 22. Hutch product.. | | | | | | | |
| 23. Jig slimes. ..... | | | | | | | |
| 24. Table slimes.... | | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | |
|---|---|---|---|
| 25. Original coal........................ | wt. in lbs. .... | % ash .... | % sulphur ... |
| 26. Washed coal...................... | " " .... | " " .... | " " .... |
| 27. Refuse............................ | " " .... | " " .... | " " .... |
| 28. Other products..................... | " " .... | " " .... | " " .... |
| 29. Loss............................... | " " .... | " " .... | " " .... |
| 30. Loss in % .... | | | |

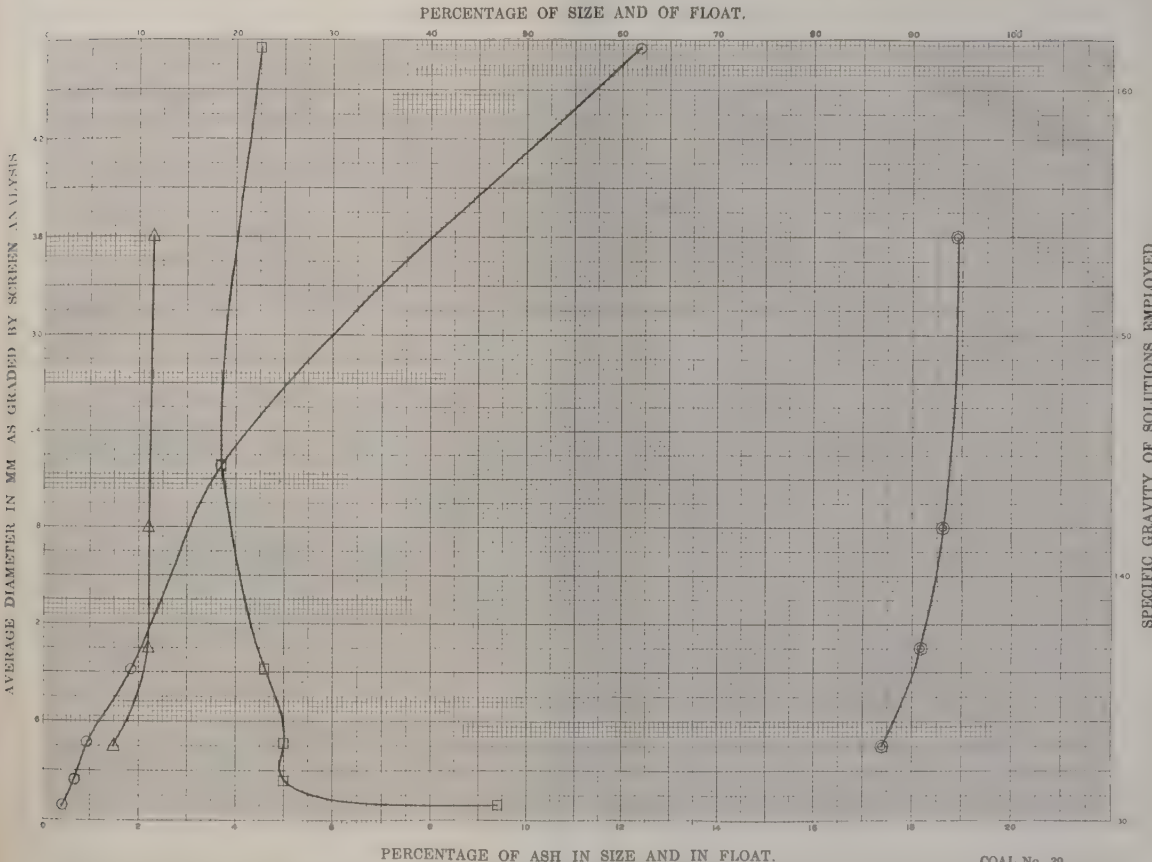
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | |
|---|---|---|---|
| 31. Recovery of washed coal, including good bone....% | .... | Ratio to standard | .... |
| 32. Reduction in ash...............................% | .... | " " | .... |
| 33. " " sulphur.........................% | .... | " " | .... |
| 34. Increase in calorific value—calorimeter..........% | | | |
| 35. Increase in evaporation under boiler............% | .... | | |
| 36. Decrease in clinker under boiler.................% | .... | | |
| 37. Fuel ratio of original coal...................... | | | |
| 38. " " washed " ..................... | | | |
| 39. Calorific value of original coal.................. | | | |
| 40. " " washed " ................. | | | |

*Remarks on Tables C, D, and E.*—This coal was not washed on a large scale.

## GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 39
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

## COAL.—No. 13.

*Locality.*—Sydney Mines, Cape Breton, N.S.

*Colliery.*—Nova Scotia Steel and Coal Co., No. 1 colliery, Main seam.

*Sample.*—Ten tons of lump coal were taken after it had been passed over a $\frac{7}{8}''$ bar screen and had been hand picked. Sampled July 5, 1907.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·560 | 91·0 | 2·3 | 9·0 | 61·7 |
| 2. | 1·460 | 88·2 | 2·0 | 11·8 | .... |
| 3. | 1·375 | 87·0 | 1·9 | 13·0 | 49·2 |
| 4. | 1·320 | 83·5 | 1·6 | 16·5 | .... |

The following results are obtained from the above data, and the chemists results:—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 87·0 | % ash | 1·8 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 3·5 | " " | 12·2 |
| 7. | Useful coal—sum of (5) and (6) | " " | 90·5 | " " | 2·3 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 9·5 | " " | 61·6 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 7·2 |
| 10. | " " " " " " | | | % sulphur | 2·9 |
| 11. | " " " " " " | | | Fuel Ratio | 1·48 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—This coal is exceptionally low in innate ash for the district from which it comes, and the refuse, while comparatively small in amount, is high in ash. The sulphur, also, is largely removable. The coal is, therefore, quite suitable for washing. The lump coal is, however, pure enough as it stands and does not need treatment. The screenings are ordinarily higher in ash and wash well.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | .... |
| 14. | 3·16 | 1·20 | 2·18 | .... | .... |
| 15. | 1·20 | 0·64 | 0·92 | .... | .... |
| 16. | 0·64 | 0·30 | 0·47 | .... | .... |
| 17. | 0·30 | 0·173 | 0·24 | .... | .... |
| 18. | 0·173 | 0·000 | 0·086 | .... | .... |

*Remarks.*—No screen analyses were made.

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal | 3251 | .... | 1322 | 6·4 | 400 | 10·5 |
| 20. Washed coal | 2917 | 4·0 | 1157 | 3·0 | 375 | 2·9 |
| 21. Refuse—coarse | .... | .... | .... | .... | .... | .... |
| 22. Hutch product | .... | .... | .... | .... | .... | .... |
| 23. Jig slimes | .... | .... | .... | .... | .... | 27·6 |
| 24. Table slimes | ..... | .... | .... | .... | .... | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 25. Original coal | wt. in lbs. | 4973 | % ash | 7·2 | % sulphur | 2·9 |
| 26. Washed coal | " " | 4449 | " " | 3·5 | " " | 1·9 |
| 27. Refuse | " " | 343 | " " | 43·5 | " " | .... |
| 28. Other products | " " | 60 | " " | 8·6 | " " | .... |
| 29. Loss | " " | 121 | " " | .... | " " | .... |

30. Loss in % 2·4.

TABLE E.

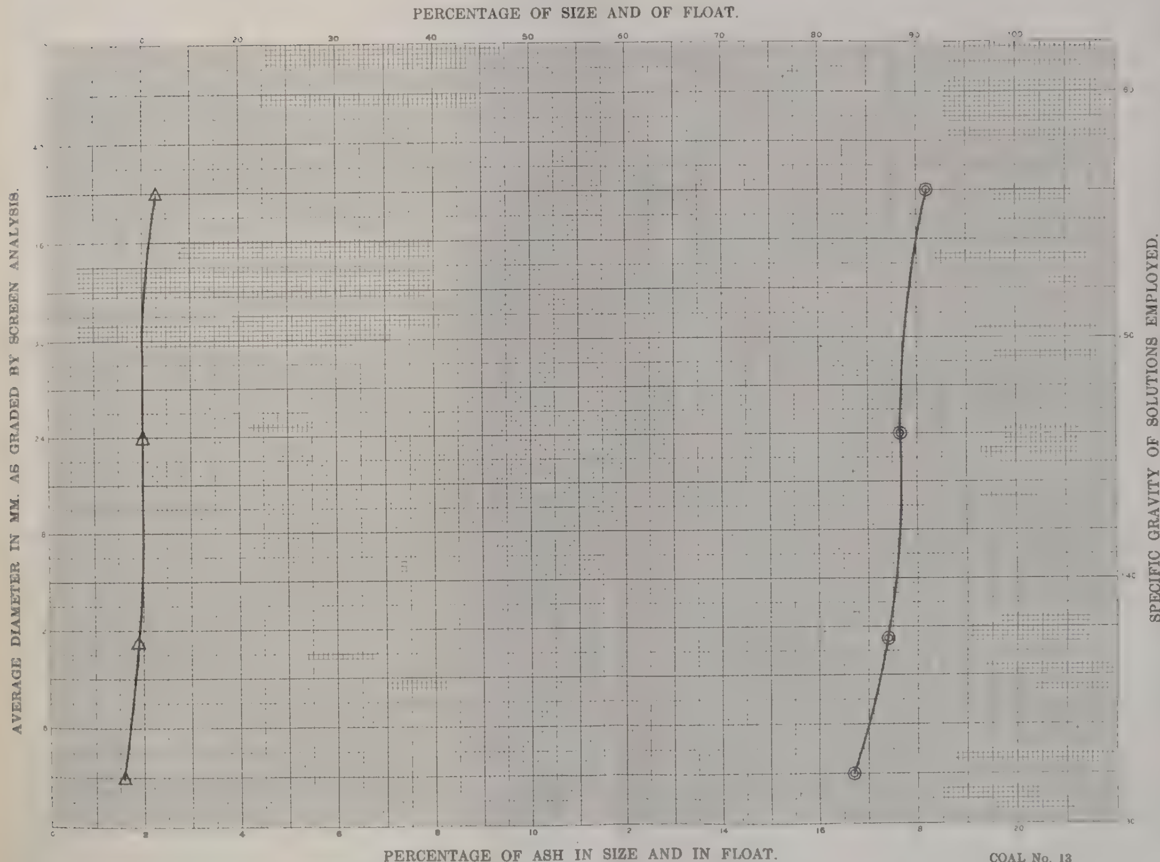
## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone | % | 89·4 | Ratio to standard | 98·7 |
| 32. Reduction in ash | % | 51·4 | " " | 65·7 |
| 33. " " sulphur | % | 34·5 | " " | 62·5 |
| 34. Increase in calorific value—calorimeter | % | 5·2 | | |
| 35. Increase in evaporation under boiler | % | 4·8 | | |
| 36. Decrease in clinker under boiler | % | 66·1 | | |
| 37. Fuel ratio of original coal | | 1·48 | | |
| 38. " " washed " | | 1·40 | | |
| 39. Calorific value of original coal | | 7650 | | |
| 40. " " washed " | | 8050 | | |

*Remarks on Tables C, D, and E.*—The procedure adopted in washing was standard and the results of the trial compare very favourably with those of the specific gravity tests. It is also possible to compare these trials with the work of a washer operated by the Company at the mines; although the latter treats screenings only, which are, of course, higher in ash than the average coal. It is stated that these screenings contain 16 per cent of ash and 2·18 per cent of sulphur and produce washed coal of 4·5 per cent ash and 1·51 per cent sulphur, with a loss of about 22 per cent. These figures correspond remarkably well with the result of the trial which was made on coal containing 7·5 per cent of ash and 2·86 per cent of sulphur, and produced a coal containing 3·46 per cent ash and 1·93 per cent sulphur, although, of course, the trial gave a lower recovery of washed coal than would have been obtained by continuous operations.

Owing to the excellent quality of the raw coal, washing operations are not justified for fuel purposes, although they are for the production of coke from screenings, or probably from run of mine coal, if it were desirable to use it for this purpose.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 13
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " densities
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

## COAL.—No. 12.

*Locality.*—Sydney Mines, C.B., N.S.

*Colliery.*—Nova Scotia Steel and Coal Co., Colliery No. 3.

*Sample.*—One hundred and fifty bags taken from the Sydney main seam in Sections 7, 8, 9, and 10, at distances of 3,200 to 5,000 feet from beginning of slope. Sample was lump coal which had been cleaned on a ½″ screen and then hand picked. Sampled July 4, 1907.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·545 | 93·8 | 3·2 | 6·2 | 56·5 |
| 2. | 1·425 | 89·2 | 2·8 | 10·8 | 41·0 |
| 3. | 1·375 | 88·0 | 2·4 | 12·0 | 34·1 |
| 4. | 1·320 | 80·4 | 1·9 | 19·6 | 25·1 |

The following results are obtained from the above data, and the chemists results:—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 88·0 | % ash | 2·4 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 6·2 | " " | 16·1 |
| 7. | Useful coal—sum of (5) and (6) | " " | 94·2 | " " | 3·3 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 5·8 | " " | 58·5 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 6·7 |
| 10. | " " " " " " | | | % sulphur | 2·5 |
| 11. | " " " " " " | | | Fuel Ratio | 1·39 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—The innate ash is low. There is very little bone, and the refuse, while small in quantity, is high in ash. Washing would improve the coal considerably, but it is already good enough for practical purposes. Screenings from this coal could probably be commercially benefited by washing, especially if used for coking.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | .... | .... | .... | .... | .... |
| 14. | .... | .... | .... | .... | .... |
| 15. | .... | .... | .... | .... | .... |
| 16. | .... | .... | .... | .... | .... |
| 17. | .... | .... | .... | .... | .... |
| 18. | .... | .... | .... | .... | .... |

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal | Not washed. | | | | | |
| 20. Washed coal | | | | | | |
| 21. Refuse—coarse | | | | | | |
| 22. Hutch product | | | | | | |
| 23. Jig slimes | | | | | | |
| 24. Table slimes | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | |
|---|---|---|---|---|---|---|
| 25. Original coal | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. Washed coal | " " | .... | " " | .... | " " | .... |
| 27. Refuse | " " | .... | " " | .... | " " | .... |
| 28. Other products | " " | .... | " " | .... | " " | .... |
| 29. Loss | " " | .... | " " | .... | " " | .... |
| 30. Loss in % | | | | | | |

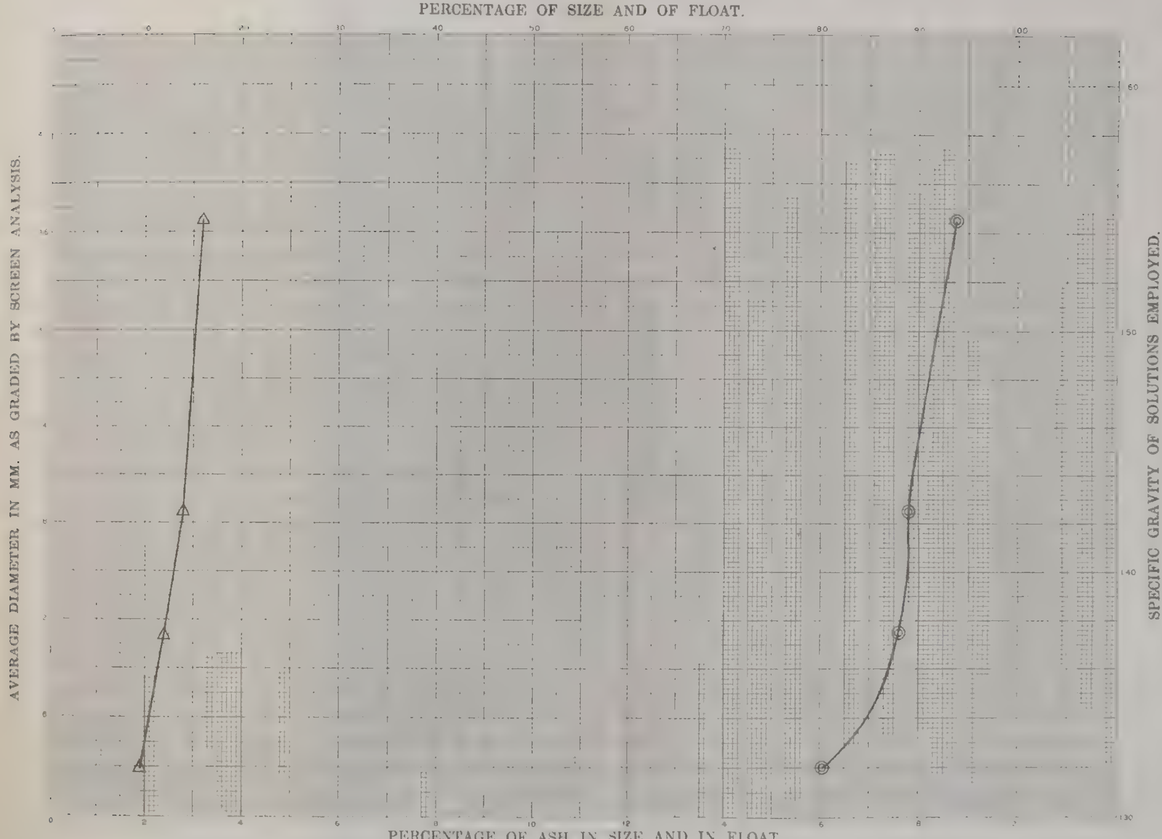
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone | % | .... | Ratio to standard | .... |
| 32. Reduction in ash | % | .... | " " | .... |
| 33. " " sulphur | % | .... | " " | .... |
| 34. Increase in calorific value—calorimeter | % | .... | | |
| 35. Increase in evaporation under boiler | % | .... | | |
| 36. Decrease in clinker under boiler | % | .... | | |
| 37. Fuel ratio of original coal | | | | |
| 38. " " washed " | | | | |
| 39. Calorific value of original coal | | | | |
| 40. " " washed " | | | | |

*Remarks on Tables C, D, and E.*—It was not considered necessary to wash this sample.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities
" " " percentage of ash in each of the several sizes.
" " " " " " " material floating at the several densities.

COAL No. 12
APPENDIX I, VOL. III

# INVERNESS COAL FIELD.

## INVERNESS CO., NOVA SCOTIA.

ERRATUM

On the curve diagrams accompanying the tabulated records of each of the coals tested, is the following legend:—

LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◉ " " " " " " material floating at the several densities.

The above legend is incorrect; in each case it should read thus:—

○ Curve showing the relative quantities of the several sizes.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " material floating at the several densities.
△ " " " " " ash in " " " " " "

## COAL.—No. 14.

*Locality.*—Inverness, Inverness county, N.S.

*Colliery.*—Inverness Coal and Railway Co., Inverness colliery.

*Sample.*—Ten tons were taken from levels 5, 6, and 7. The sample consisted of lump coal which had been passed over a $\frac{5}{8}''$ shaking screen and then hand picked. Sampled July 12 and 15, 1907.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·540 | 84·5 | 5·5 | 15·5 | 43·4 |
| 2. | 1·455 | 77·0 | 4·5 | 23·0 | .... |
| 3. | 1·370 | 64·0 | 3·6 | 36·0 | 22·7 |
| 4. | 1·310 | 17·0 | 3·1 | 83·0 | 11·5 |

The following results are obtained from the above data, and the chemists results:—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 65·0 | % ash | 3·6 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 20·0 | " " | 11·7 |
| 7. | Useful coal—sum of (5) and (6) | " " | 85·0 | " " | 5·6 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 15·0 | " " | 39·1 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 10·4 |
| 10. | " " " " " " | | | % sulphur | 5·0 |
| 11. | " " " " " " | | | Fuel Ratio | 1·24 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—This coal contains a comparatively small proportion of innate ash, a large proportion of bone coal, low in ash, and a considerable proportion of refuse, very low in ash. The sulphur is very high. The coal can be considerably improved, both as regards ash and sulphur, by washing, but it is a very difficult material to treat, owing to its physical characteristics and the peculiar distribution of the sulphur, which is largely in thin scales.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | .... |
| 14. | 3·16 | 1·20 | 2·18 | .... | .... |
| 15. | 1·20 | 0·64 | 0·92 | .... | .... |
| 16. | 0·64 | 0·30 | 0·47 | .... | .... |
| 17. | 0·30 | 0·173 | 0·24 | .... | .... |
| 18. | 0·173 | 0·000 | 0·086 | .... | .... |

*Remarks.*—No screen analyses were made.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash % | Sizes under ⅛″ Total wt. lbs. | Ash % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal | 3519 | 9·2 | 1216 | 8·2 | 380 | 13·7 |
| 20. | Washed coal | 3143 | 6·4 | 1063 | 5·3 | 234 | 5·7 |
| 21. | Refuse—coarse | .... | .... | .... | .... | .... | .... |
| 22. | Hutch product | .... | .... | .... | .... | .... | 27·6 |
| 23. | Jig slimes | .... | .... | .... | .... | .... | .... |
| 24. | Table slimes | .... | .... | .... | .... | .... | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal | wt. in lbs. | 5115 | % ash | 10·4 | % sulphur | 6·0 |
| 26. | Washed coal | " " | 4440 | " " | 6·5 | " " | 5·0 |
| 27. | Refuse | " " | 603 | " " | 34·4 | " " | .... |
| 28. | Other products | " " | 80 | " " | 8·0 | " " | .... |
| 29. | Loss | " " | 8 | " " | .... | " " | .... |

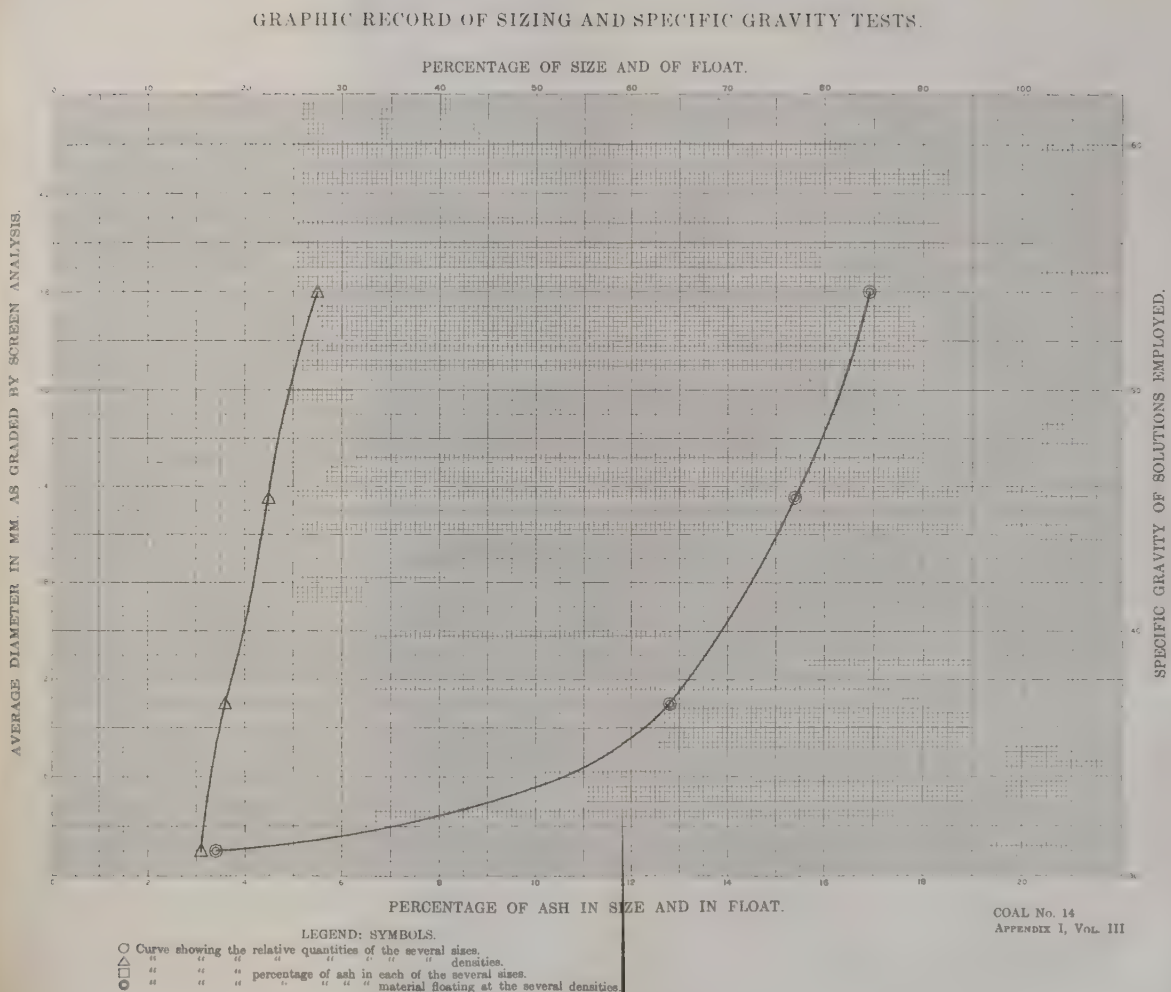
30. Loss in % 0·0.

TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | | |
|---|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone | % | 86·7 | Ratio to standard | 102·0 |
| 32. | Reduction in ash | % | 37·5 | " " | 86·1 |
| 33. | " " sulphur | % | 16·7 | " " | 62·5 |
| 34. | Increase in calorific value—calorimeter | % | 5·3 | | |
| 35. | Increase in evaporation under boiler | % | 5·9 | | |
| 36. | Decrease in clinker under boiler | % | 56·9 | | |
| 37. | Fuel ratio of original coal | | 1·24 | | |
| 38. | " " washed " | | 1·20 | | |
| 39. | Calorific value of original coal | | 6750 | | |
| 40. | " " washed " | | 7110 | | |

*Remarks on Tables C, D, and E.*—The procedure in washing was standard, and the results of the trial compare very well with those of the specific gravity determinations, although the recovery of washed coal is lower and the waste in refuse higher than would be the case in a continuous commercial operation. The coal is unsuitable for coke on account of its high organic sulphur, and the improvement in steaming qualities is not sufficient to justify washing for fuel purposes, particularly as the raw coal itself is not very high in ash.


GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.
PERCENTAGE OF SIZE AND OF FLOAT.
AVERAGE DIAMETER IN MM. AS GRADED BY SCREEN ANALYSIS.
SPECIFIC GRAVITY OF SOLUTIONS EMPLOYED.
PERCENTAGE OF ASH IN SIZE AND IN FLOAT.
COAL No. 14
APPENDIX I, VOL. III
LEGEND: SYMBOLS.
○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

## COAL—No. 15.

*Locality.*—Port Hood, Inverness county, N.S.

*Colliery.*—Richmond Railway and Coal Co., Port Hood colliery.

*Sample.*—Ten tons were taken from the 1,400 ft. and the 1,900 ft. levels, from which the major part of the output of the mine was at that time being drawn. The sample consisted of lump coal which had been passed over a $\frac{3}{4}''$ screen and then hand picked. Sampled July 15, 1907.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·520 | 76·0 | 7·8 | 24·0 | 36·4 |
| 2. | 1·435 | 63·5 | 6·1 | 36·5 | .... |
| 3. | 1·375 | 38·0 | 4·85 | 62·0 | 20·5 |
| 4. | 1·325 | 20·3 | 4·2 | 79·7 | .... |

The following results are obtained from the above data, and the chemists results:—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1.375 | % yield | 38·0 | % ash | 4·9 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 40·0 | " " | 12·0 |
| 7. | Useful coal—sum of (5) and (6) | " " | 78·0 | " " | 8·3 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 22·0 | " " | 36·5 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 14·6 |
| 10. | " " " " " " | | | % sulphur | 7·9 |
| 11. | " " " " " " | | | Fuel Ratio | 1·30 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—This coal has a moderate proportion of innate ash, a very large proportion of bone coal, low in ash, and a large proportion of refuse, very low in ash. The sulphur is very high and cannot be largely reduced, and while the ash can be considerably lowered by washing the coal is difficult to treat.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | ... |
| 14. | 3·16 | 1·20 | 2·18 | .... | ... |
| 15. | 1·20 | 0·64 | 0·92 | .... | ... |
| 16. | 0·64 | 0·30 | 0·47 | .... | ... |
| 17. | 0·30 | 0·173 | 0·24 | .... | ... |
| 18. | 0·173 | 0·000 | 0·086 | .... | ... |

*Remarks.*—No screen analyses were made.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal | 4138 | 14·9 | 1169 | 13·7 | 540 | 16·4 |
| 20. | Washed coal | 3009 | 10·3 | 1007 | 9·4 | 398 | 9·9 |
| 21. | Refuse—coarse | .... | .... | .... | .... | .... | .... |
| 22. | Hutch product | .... | .... | .... | .... | .... | 36·2 |
| 23. | Jig slimes | .... | .... | .... | .... | .... | .... |
| 24. | Table slimes | .... | .... | .... | .... | .... | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal | wt. in lbs. | 5847 | % ash | 14·6 | % sulphur | 7·9 |
| 26. | Washed coal | " " | 4414 | " " | 10·9 | " " | 6·7 |
| 27. | Refuse | " " | 1336 | " " | 26·8 | " " | .... |
| 28. | Other products | " " | 35 | " " | 12·3 | " " | .... |
| 29. | Loss | " " | 62 | " " | .... | " " | .... |

30. Loss in % 1·6.

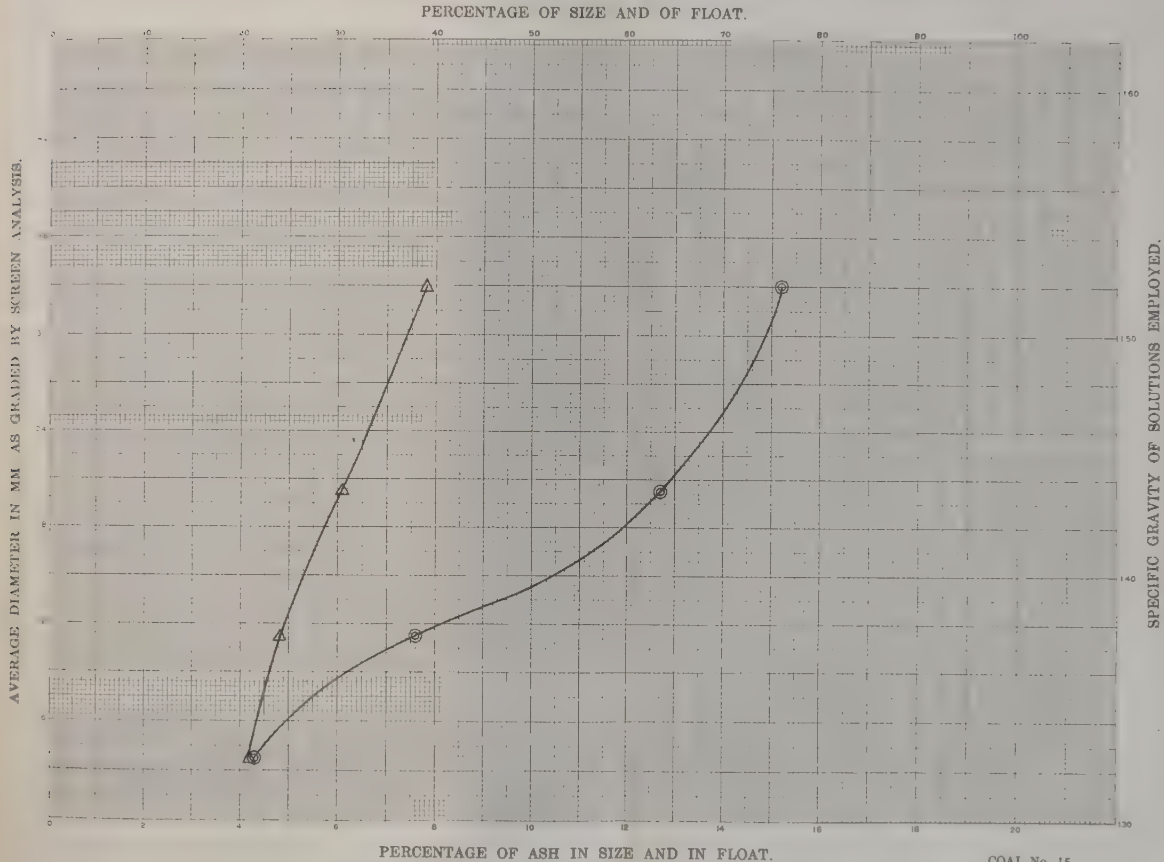
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | | |
|---|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone | % | 75·5 | Ratio to standard | 96·8 |
| 32. | Reduction in ash | % | 25·4 | " " | 76·1 |
| 33. | " " sulphur | % | 15·2 | " " | 60·0 |
| 34. | Increase in calorific value—calorimeter | % | 6·6 | | |
| 35. | Increase in evaporation under boiler | % | 5·8 | | |
| 36. | Decrease in clinker under boiler | % | 39·4 | | |
| 37. | Fuel ratio of original coal | | 1·30 | | |
| 38. | " " washed " | | 1·35 | | |
| 39. | Calorific value of original coal | | 6540 | | |
| 40. | " " washed " | | 6970 | | |

*Remarks on Tables C, D, and E.*—The procedure in washing was standard and the results compare fairly well with those of the specific gravity tests, although the recovery of washed coal is lower than would be the case in a continuous commercial operation. The standard for refuse is probably a little high in this case, but as the coal is unsuitable for coking, and washing does not very greatly increase its steaming powers, it is unlikely that washing would be commercially justifiable.

## GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 15
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

◯ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
⊙ " " " " " " " material floating at the several densities.

# PICTOU COAL FIELD.

## PICTOU CO., NOVA SCOTIA.

### ERRATUM

On the curve diagrams accompanying the tabulated records of each of the coals tested, is the following legend:—

LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.<br>
△ " " " " " " " " densities.<br>
□ " " " percentage of ash in each of the several sizes.<br>
◎ " " " " " " material floating at the several densities.

The above legend is incorrect; in each case it should read thus:—

○ Curve showing the relative quantities of the several sizes.<br>
□ " " " percentage of ash in each of the several sizes.<br>
◎ " " " " " material floating at the several densities.<br>
△ " " " " " ash in " " " " " "

## COAL.—No. 4.

*Locality.*—Thorburn, Pictou county, N.S.

*Colliery.*—Acadia Coal Company, Vale colliery, Six Foot seam.

*Sample.*—Six tons were taken from the Six Foot seam. The sample was passed over a $\frac{3}{4}''$ screen and then hand picked. Sampled March 25, 1907.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·52.............. | 84·7 | 10·2 | 15·3 | 55·4 |
| 2. | 1·44.............. | 77·4 | 9·5 | 22·6 | 45·3 |
| 3. | 1·375............. | 64·8 | 8·7 | 35·2 | 33·8 |
| 4. | 1·31.............. | 27·6 | 7·9 | 72·4 | .... |

The following results are obtained from the above data, and the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375........................ | % yield | 64·6 | % ash | 8·7 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55...................... | " " | 21·9 | " " | 15·5 |
| 7. | Useful coal—sum of (5) and (6)........................ | " " | 86·5 | " " | 10·5 |
| 8. | Refuse, Sp. Gr. over 1·55 ............................ | " " | 13·5 | " " | 56·8 |
| 9. | Assay of original sample raw coal as sent to chemist.............. | | | " " | 17·3 |
| 10. | " " " " " " .............. | | | % sulphur | 1·0 |
| 11. | " " " " " " .............. | | | Fuel Ratio | 1·57 |
| 12. | Assay of mixed good and bone coal (5) and (6).................... | | | " " | .... |

*Remarks.*—This coal has a high proportion of innate ash, a large proportion of bone, rather low in ash, and a considerable proportion of refuse proper. The ash should be considerably reduced by careful washing, although the coal is, apparently, a somewhat difficult one to treat. The sulphur is already comparatively low.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | .... |
| 14. | 3·16 | 1·20 | 2·18 | .... | .... |
| 15. | 1·20 | 0·64 | 0·92 | .... | .... |
| 16. | 0·64 | 0·30 | 0·47 | .... | .... |
| 17. | 0·30 | 0·173 | 0·24 | .... | .... |
| 18. | 0·173 | 0·000 | 0·086 | .... | .... |

*Remarks.*—No screen analyses were made.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | .... | 16·8 | .... | 15·4 | .... | 18·2 |
| 20. | Washed coal.... | 2943 | 13·9 | 1408* | .... | .... | .... |
| 21. | Refuse—coarse.. | .... | .... | .... | .... | .... | .... |
| 22. | Hutch product.. | .... | .... | .... | .... | .... | .... |
| 23. | Jig slimes...... | .... | .... | .... | .... | .... | .... |
| 24. | Table slimes.... | .... | .... | .... | .... | .... | .... |

* Inclusive

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal ........................ | wt. in lbs. | 5280 | % ash | 17·3 | % sulphur | 1·0 |
| 26. | Washed coal........................ | " " | 4351 | " " | 12·6 | " " | 1·0 |
| 27. | Refuse........................ | " " | 762 | " " | 58·3 | " " | .... |
| 28. | Other products........................ | " " | 67 | " " | 18·4 | " " | .... |
| 29. | Loss........................ | " " | 100 | " " | .... | " " | .... |
| 30. | Loss in % 1·9 | | | | | | |

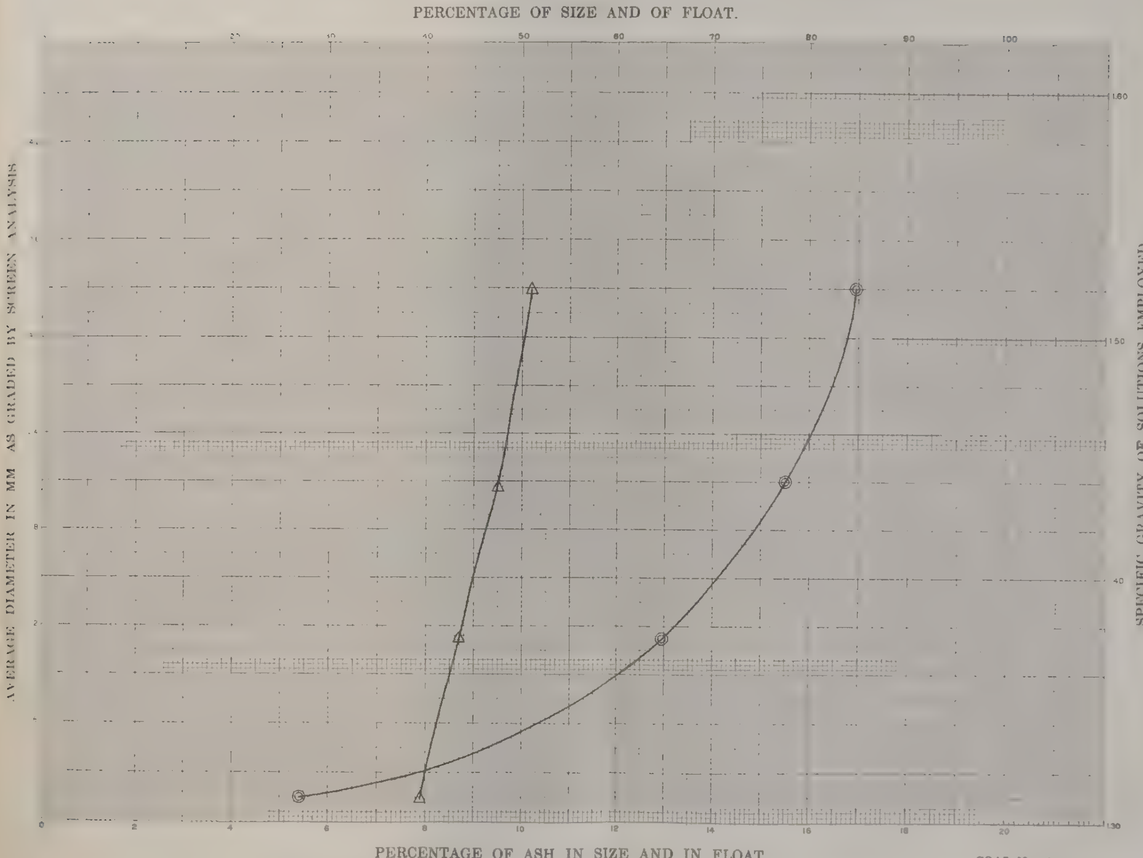
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. . . % | 82·5 | Ratio to standard | 95·4 |
| 32. | Reduction in ash........................% | 27·2 | " " | 83·3 |
| 33. | " " sulphur........................% | 0·0 | " " | .... |
| 34. | Increase in calorific value—calorimeter..........% | 6·1 | | |
| 35. | Increase in evaporation under boiler............% | 4·2 | | |
| 36. | Decrease in clinker under boiler.................% | 33·4 | | |
| 37. | Fuel ratio of original coal...................... | 1·57 | | |
| 38. | " " washed " ...................... | 1·63 | | |
| 39. | Calorific value of original coal.................. | 6680 | | |
| 40. | " " washed " ................. | 7090 | | |

*Remarks on Tables C, D, and E.*—The procedure in washing was normal, although the tabulated results show that two sizes, which were separately washed, were weighed together. The results of the washing tests compare very well with the specific gravity determinations, although the recovery is less and the loss is greater than would be the case in a commercial operation.

GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 4
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

## COAL.—No. 16.

*Locality.*—Stellarton, Pictou county, N.S.

*Colliery.*—Acadia Coal Co., Allan Shaft colliery.

*Sample.*—One hundred and fifty bags from top bench of Foord seam on east sinking 500 feet from bottom of shaft. Sample was run of mine which had been hand picked. Sampled July 20, 1907.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·542 | 95·4 | 8·4 | 4·6 | 52·0 |
| 2. | 1·423 | 91·5 | 8·1 | 8·5 | 36·8 |
| 3. | 1·370 | 82·3 | 7·1 | 17·7 | 26·8 |
| 4. | 1·325 | 51·1 | 5·2 | 48·9 | 16·6 |

The following results are obtained from the above data, and from the chemists reports:—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 83·7 | % ash | 7·2 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 11·8 | " " | 16·9 |
| 7. | Useful coal—sum of (5) and (6) | " " | 95·5 | " " | 8·4 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 4·5 | " " | 57·4 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 11·3 |
| 10. | " " " " " " | | | % sulphur | 0·6 |
| 11. | " " " " " " | | | Fuel Ratio | 1·66 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—This coal is high in innate ash and contains a moderate amount of average bone. The refuse is low in amount and rather high in ash. Washing would improve it appreciably, especially if the dividing line between bone and refuse were lowered below the standard adopted for these trials. It cannot, however, be very greatly improved as the innate ash is too high.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample. | % Ash in size. |
|---|---|---|---|---|---|
| 13. | .... | .... | .... | .... | .... |
| 14. | .... | .... | .... | .... | .... |
| 15. | .... | .... | .... | .... | .... |
| 16. | .... | .... | .... | .... | .... |
| 17. | .... | .... | .... | .... | .... |
| 18. | .... | .... | .... | .... | .... |

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal .. | This coal was not washed. | | | | | |
| 20. Washed coal... | | | | | | |
| 21. Refuse—coarse. | | | | | | |
| 22. Hutch product. | | | | | | |
| 23. Jig slimes. .... | | | | | | |
| 24. Table slimes... | | | | | | |

TABLE D.

## Results of Washing (Totals).

25. Original coal ......................wt. in lbs. .... % ash .... % sulphur ....
26. Washed coal......................... " " .... " " .... " " ....
27. Refuse.............................. " " .... " " .... " " ....
28. Other products...................... " " .... " " .... " " ....
29. Loss................................ " " .... " " .... " " ....
30. Loss in %

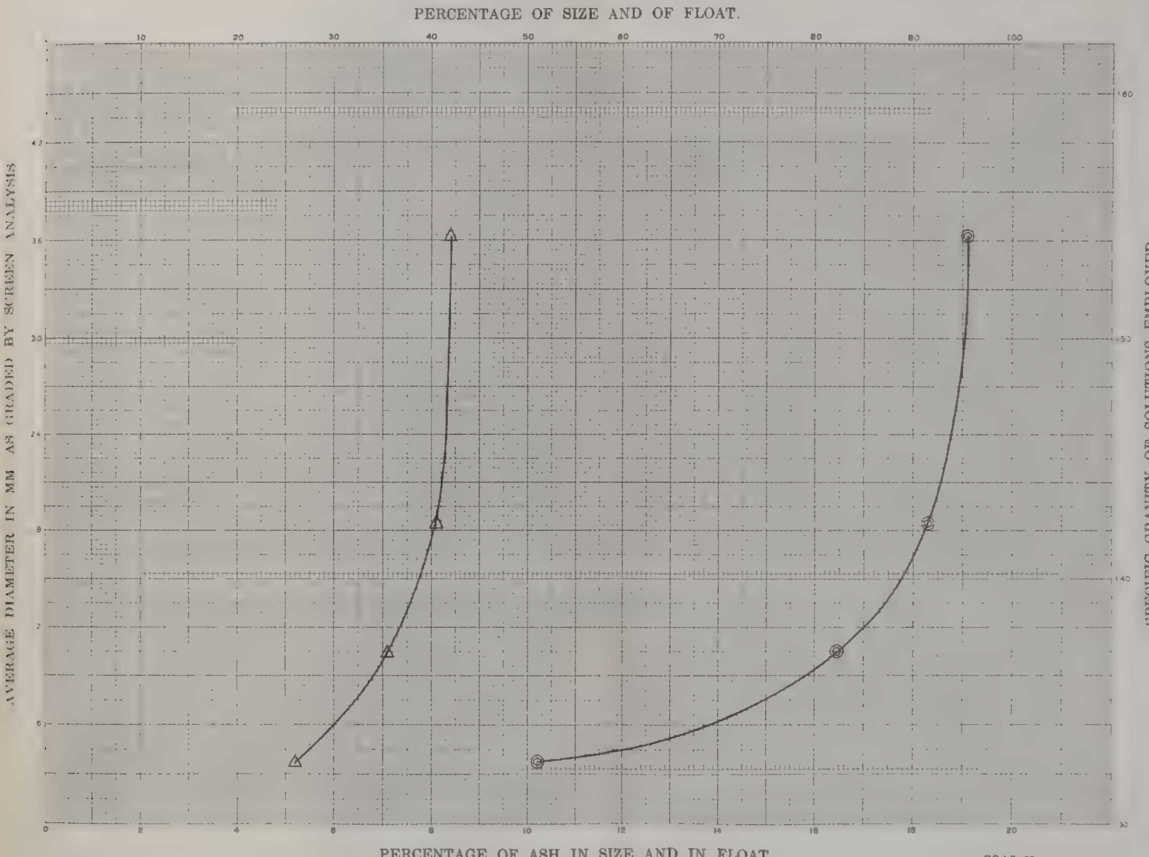
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

31. Recovery of washed coal, including good bone ...% .... Ratio to standard ....
32. Reduction in ash..........................% .... " " ....
33. " " sulphur.........................% .... " " ....
34. Increase in calorific value—calorimeter..........% ....
35. Increase in evaporation under boiler.............% ....
36. Decrease in clinker under boiler.................% ....
37. Fuel ratio of original coal..................... ....
38. " " washed " ..................... ....
39. Calorific value of original coal................. ....
40. " " washed " ................. ....

*Remarks on Tables C, D, and E.*—It was not considered necessary to wash this sample.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 16
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◉ " " " " " " " material floating at the several densities.

## COAL.—No. 1.

*Locality.*—Stellarton, Pictou county, N.S.

*Colliery.*—Acadia Coal Co., Albion colliery, 3rd seam.

*Sample.*—Ten tons taken from rooms in the 3rd seam, 1,400 feet northwesterly from the slope, at a depth of about 1,100 feet, vertically from the surface. The sample was taken directly from the mine cars, and is classed as run of mine. Sampled March 26, 1907.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·560............. | 93·0 | 11·5 | 7·0 | 50·5 |
| 2. | 1·460............. | 85·2 | 10·7 | 14·8 | 35·6 |
| 3. | 1·380............. | 78·7 | 10·0 | 21·3 | 30·5 |
| 4. | 1·325............. | 54·9 | 9·2 | 45·1 | .... |

The following results are obtained from the above data, and the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375.......................... | % yield | 77·5 | % ash | 10·0 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55...................... | " " | 13·5 | " " | 18·9 |
| 7. | Useful coal—sum of (5) and (6)........................ | " " | 91·0 | " " | 11·4 |
| 8. | Refuse, Sp. Gr. over 1·55 ............................ | " " | 9·0 | " " | 48·0 |
| 9. | Assay of original sample raw coal as sent to chemist.............. | | | " " | 14·7 |
| 10. | " " " " " " .............. | | | % sulphur | 1·4 |
| 11. | " " " " " " .............. | | | Fuel Ratio | 1·86 |
| 12. | Assay of mixed good and bone coal (5) and (6) .............. | | | " " | .... |

*Remarks.*—This coal has a very high proportion of innate ash for the district, a high proportion of medium bone coal, and a small proportion of refuse. The ash in the coal, therefore, cannot be materially reduced by washing, although the sulphur can be appreciably lowered.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | .... |
| 14. | 3·16 | 1·20 | 2·18 | .... | .... |
| 15. | 1·20 | 0·64 | 0·92 | .... | .... |
| 16. | 0·64 | 0·30 | 0·47 | .... | .... |
| 17. | 0·30 | 0·173 | 0·24 | .... | .... |
| 18. | 0·173 | 0·000 | 0·086 | .... | .... |

*Remarks.*—No screen analyses were made.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | 2834 | 14·8 | 1488 | 12·5 | 630 | 13·4 |
| 20. | Washed coal.... | 2522 | 11·5 | 1272 | 11·0 | 474 | 10·4 |
| 21. | Refuse—coarse.. | .... | .... | .... | .... | .... | .... |
| 22. | Hutch product.. | .... | .... | .... | .... | .... | .... |
| 23. | Jig slimes...... | .... | .... | .... | .... | .... | .... |
| 24. | Table slimes.... | .... | .... | .... | .... | .... | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 25. | Original coal ........................ | wt. in lbs. | 4952 | % ash | 14·7 | % sulphur | 1·4 |
| 26. | Washed coal.......................... | " " | 4268 | " " | 12·3 | " " | 1·0 |
| 27. | Refuse.............................. | " " | 474 | " " | 33·1 | " " | .... |
| 28. | Other products...................... | " " | 117 | " " | 9·7 | " " | .... |
| 29. | Loss................................ | " " | 93 | " " | .... | " " | .... |
| 30. | Loss in % 1·9. | | | | | | |

TABLE E.

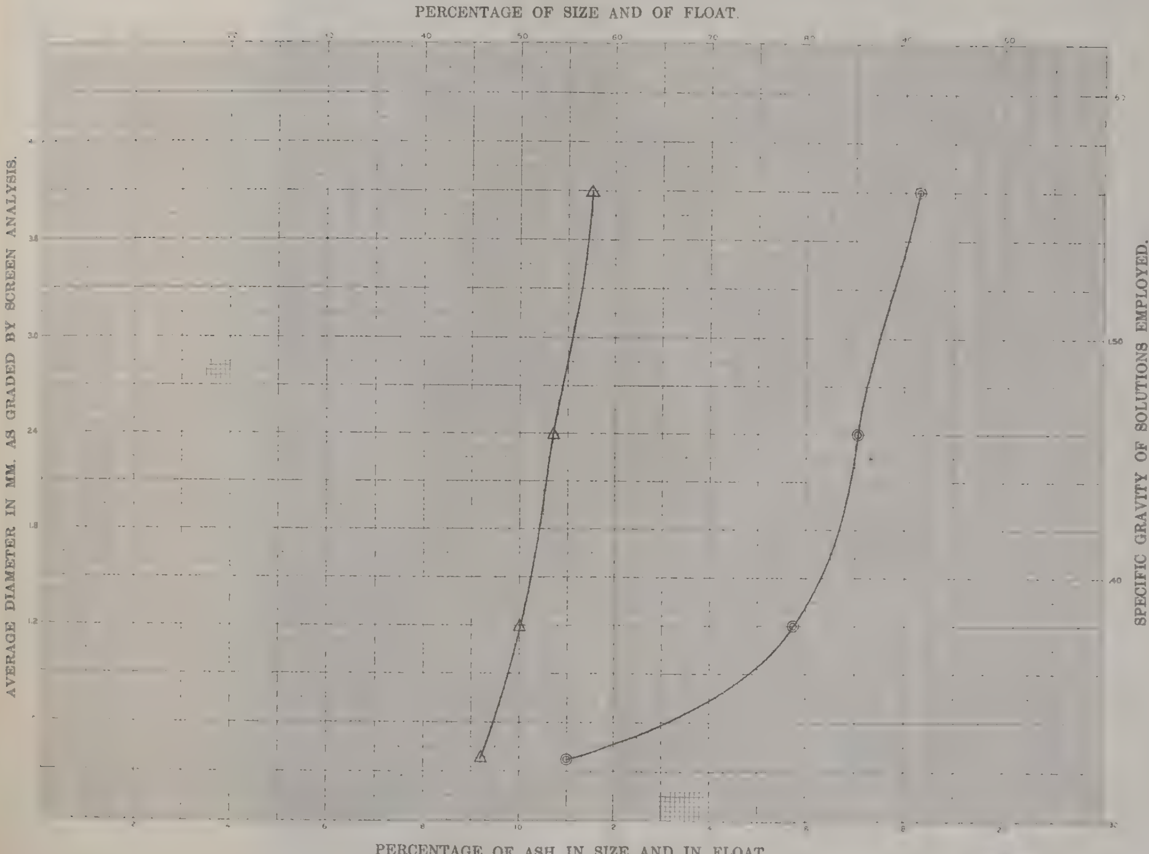
## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. . % | 86·0 | Ratio to standard | 94·5 |
| 32. | Reduction in ash.......................... % | 16·3 | " " | 92·7 |
| 33. | " " sulphur......................... % | 28·6 | " " | 100·0 |
| 34. | Increase in calorific value—calorimeter.......... % | 3·7 | | |
| 35. | Increase in evaporation under boiler............ % | 7·2 | | |
| 36. | Decrease in clinker under boiler................ % | 9·6 | | |
| 37. | Fuel ratio of original coal...................... | 1·86 | | |
| 38. | " " washed " ...................... | 1·85 | | |
| 39. | Calorific value of original coal................. | 6990 | | |
| 40. | " " washed " ................ | 7250 | | |

*Remarks on Tables C, D, and E.*—The procedure adopted in washing this coal differed from the standard in that the second size (from ½″ to ⅛″) was rejigged, as the first run did not give very satisfactory results. This rejigging, however, gave a refuse low in ash, thus indicating that the first jigging was more nearly perfect than had been supposed. In this connexion, the distribution of ash in the three sizes is worth noting, as it shows that the coarsest and finest sizes are more suitable for washing than the second size, thus confirming the above conclusions by experiments. All of the hutch product made was rejigged and the final hutch added to the refuse.

This coal contains much innate ash and a large proportion of bone, with a very small portion of what might be termed straight refuse. It is thus an unsatisfactory coal to wash, as a considerable improvement can only be secured by the elimination of an excessive amount of material which has appreciable fuel value. On the whole, it is doubtful whether washing can be made commercially successful, although the results of a continual operation on a commercial scale would give a higher recovery of good coal and a lower percentage of fuel in the waste than the above test.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. 1
APPENDIX 1, VOL. III

COAL.—No. 2.

*Locality.*—Stellarton, Pictou county, N.S.

*Colliery.*—Acadia Coal Co., Albion colliery, Cage Pit seam.

*Sample.*—Ninety-four bags of run of mine coal from level on north side of main slope at a depth of 2,600 feet, 700 feet vertical. Sampled March 26, 1907.

TABLE A.

**Specific Gravity Tests.**

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·551 | 95·0 | 8·1 | 5·0 | 48·7 |
| 2. | 1·426 | 88·8 | 7·4 | 11·2 | 32·2 |
| 3. | 1·380 | 74·4 | 6·1 | 25·6 | 22·4 |
| 4. | 1·325 | 34·3 | 3·7 | 65·7 | 13·9 |

The following results are obtained from the above data, and the chemists results:—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 71·7 | % ash | 5·9 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 23·3 | " " | 14·8 |
| 7. | Useful coal—sum of (5) and (6) | " " | 95·0 | " " | 8·1 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 5·0 | " " | 50·2 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 10·5 |
| 10. | " " " " " " | | | % sulphur | 0·9 |
| 11. | " " " " " " | | | Fuel Ratio | 1·85 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—This coal has high innate ash for the district and a large proportion of bone coal, carrying moderate ash. The refuse is small in amount and low in ash. The coal could not be commercially improved by washing.

TABLE B.

**Screen Analysis.**

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample. | % Ash in size. |
|---|---|---|---|---|---|
| 13. | .... | .... | .... | .... | .... |
| 14. | .... | .... | .... | .... | .... |
| 15. | .... | .... | .... | .... | .... |
| 16. | .... | .... | .... | .... | .... |
| 17. | .... | .... | .... | .... | .... |
| 18. | .... | .... | .... | .... | .... |

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal .. | This coal was not washed. | | | | | |
| 20. Washed coal... | | | | | | |
| 21. Refuse—coarse. | | | | | | |
| 22. Hutch product. | | | | | | |
| 23. Jig slimes. .... | | | | | | |
| 24. Table slimes... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. Original coal ........................ | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. Washed coal........................ | " " | .... | " " | .... | " " | .... |
| 27. Refuse........................ | " " | .... | " " | .... | " " | .... |
| 28. Other products........................ | " " | .... | " " | .... | " " | .... |
| 29. Loss........................ | " " | .... | " " | .... | " " | .... |
| 30. Loss in % | | | | | | |

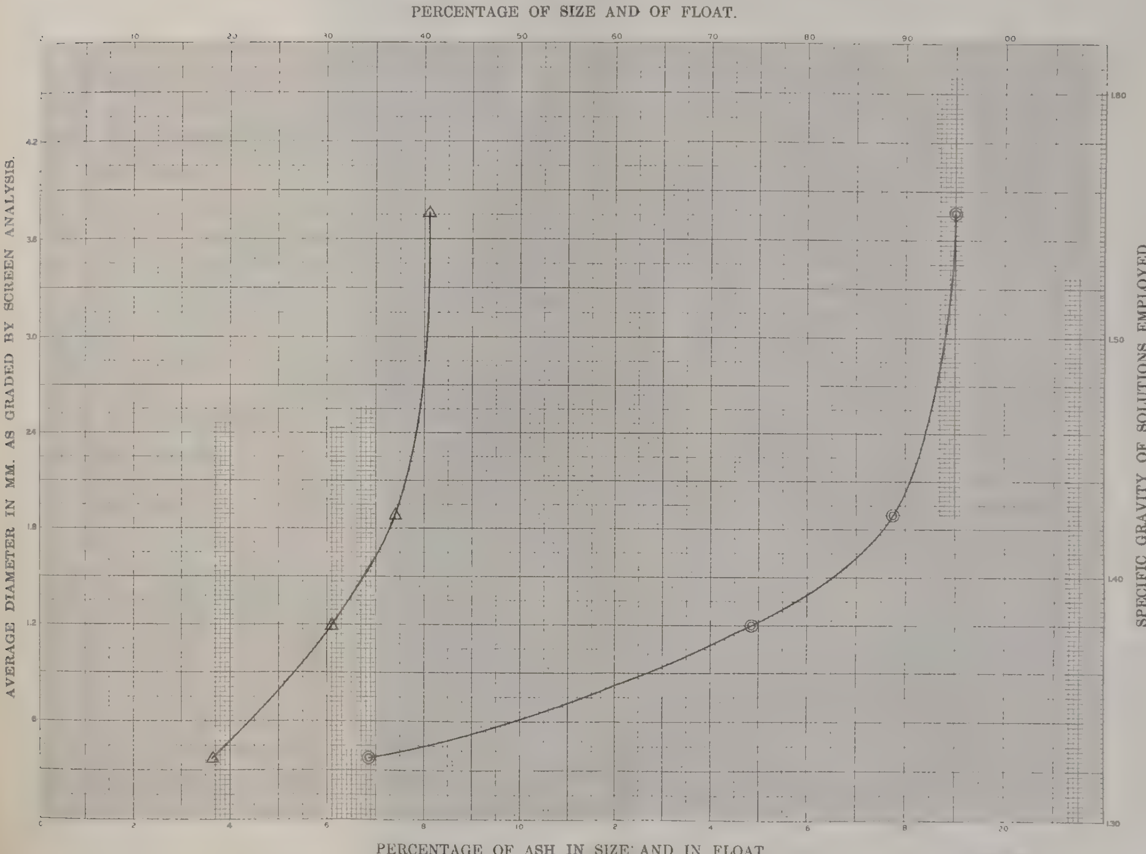
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone. .. | % | .... | Ratio to standard | .... |
| 32. Reduction in ash........................ | % | .... | " " | .... |
| 33. " " sulphur........................ | % | .... | " " | .... |
| 34. Increase in calorific value—calorimeter ......... | % | .... | | |
| 35. Increase in evaporation under boiler............ | % | .... | | |
| 36. Decrease in clinker under boiler................ | % | .... | | |
| 37. Fuel ratio of original coal..................... | | .... | | |
| 38. " " washed " ..................... | | .... | | |
| 39. Calorific value of original coal.................. | | .... | | |
| 40 " " washed " ................. | | .... | | |

*Remarks on Tables C, D, and E.*—It was not considered necessary to wash this sample.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. 2
APPENDIX I, VOL. III

## COAL.—No. 8.

*Locality.*—Westville, Pictou county, N.S.

*Colliery.*—Acadia Coal Co., Acadia colliery, Main seam.

*Sample.*—Seventy-five bags from II level 5,000 feet south. The sample was lump coal which had been cleaned on a 1″ screen and then hand picked. Sampled March 28, 1907.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·553............ | 94·4 | 6·7 | 5·6 | 48·5 |
| 2. | 1·426............ | 86·8 | 5·5 | 13·2 | 34·7 |
| 3. | 1·380............ | 80·3 | 4·1 | 19·7 | 26·2 |
| 4. | 1·325............ | 58·2 | 2·6 | 41·8 | 17·6 |

The following results are obtained from the above data, and the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375...................... | % yield | 79·4 | % ash | 4·0 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55.................... | " " | 14·9 | " " | 21·1 |
| 7. | Useful coal—sum of (5) and (6)...................... | " " | 94·3 | " " | 6·7 |
| 8. | Refuse, Sp. Gr. over 1·55.......................... | " " | 5·7 | " " | 45·3 |
| 9. | Assay of original sample raw coal as sent to chemist............. | | | " " | 9·2 |
| 10. | " " " " " " ............. | | | % sulphur | 0·9 |
| 11. | " " " " " " ............. | | | Fuel Ratio | 2·41 |
| 12. | Assay of mixed good and bone coal (5) and (6).................. | | | " " | .... |

*Remarks.*—This coal carries a comparatively small proportion of innate ash and the bone coal is moderately low, both in quantity and ash. The refuse is low in ash and the coal would be very little improved by washing, which is out of the question from the commercial point of view.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample. | % Ash in size. |
|---|---|---|---|---|---|
| 13. | .... | .... | .... | .... | .... |
| 14. | .... | .... | .... | .... | .... |
| 15. | .... | .... | .... | .... | .... |
| 16. | .... | .... | .... | .... | .... |
| 17. | .... | .... | .... | .... | .... |
| 18. | .... | .... | .... | .... | .... |

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal .. | This coal was not washed. | | | | | |
| 20. Washed coal... | | | | | | |
| 21. Refuse—coarse. | | | | | | |
| 22. Hutch product. | | | | | | |
| 23. Jig slimes. .... | | | | | | |
| 24. Table slimes... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | |
|---|---|---|---|---|---|---|
| 25. Original coal.......................... | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. Washed coal.......................... | " " | .... | " " | .... | " " | .... |
| 27. Refuse.......................... | " " | .... | " " | .... | " " | .... |
| 28. Other products.......................... | " " | .... | " " | .... | " " | .... |
| 29. Loss.......................... | | .... | | .... | | .... |
| 30. Loss in % | | | | | | |

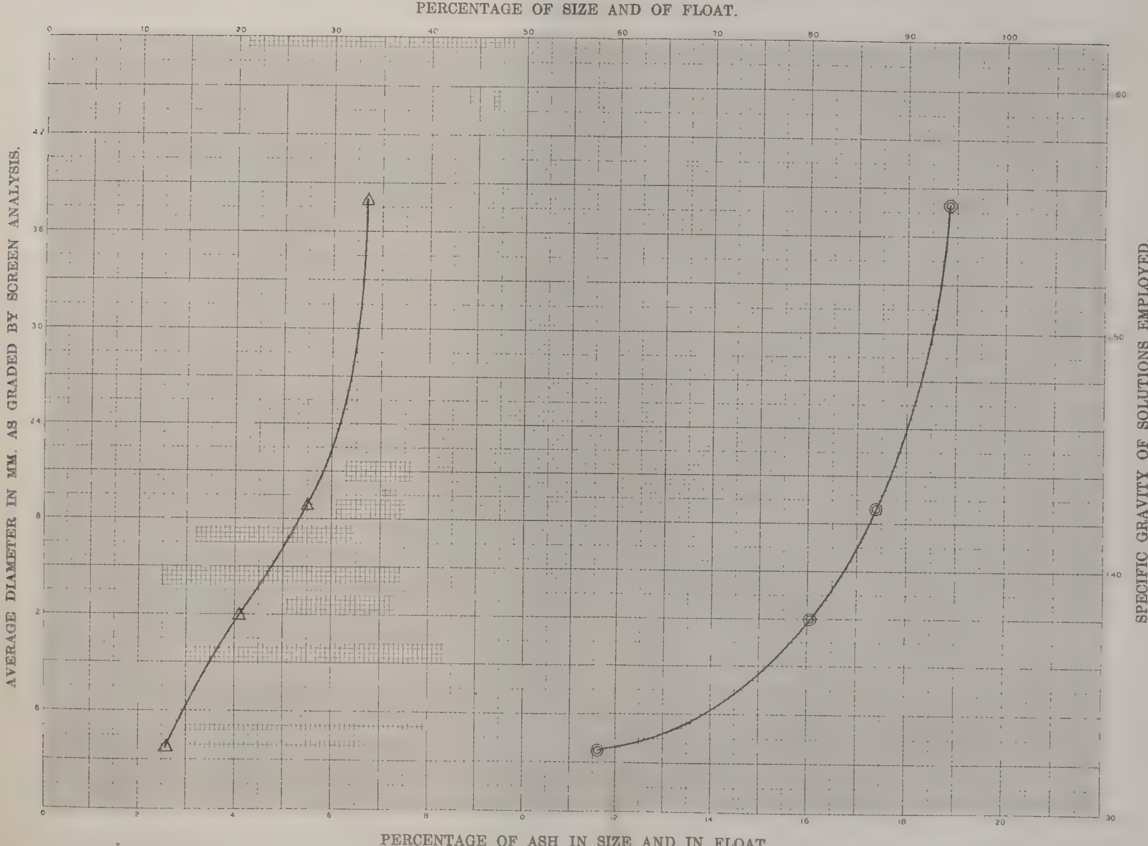
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone.. | % | .... | Ratio to standard | .... |
| 32. Reduction in ash.......................... | % | .... | " " | .... |
| 33. " " sulphur.......................... | % | .... | " " | .... |
| 34. Increase in calorific value—calorimeter........ | % | .... | | |
| 35. Increase in evaporation under boiler........... | % | .... | | |
| 36. Decrease in clinker under boiler............... | % | .... | | |
| 37. Fuel ratio of original coal.................... | | .... | | |
| 38. " " washed. " .................... | | .... | | |
| 39. Calorific value of original coal................ | | .... | | |
| 40. " " washed " ................ | | .... | | |

*Remarks on Tables C, D, and E.*—It was not considered necessary to wash this sample.

GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. 8
APPENDIX I, VOL. III

## COAL.—No. 3.

*Locality.*—Westville, Pictou county, N.S.

*Colliery.*—Intercolonial Coal Company, Drummond colliery, Main seam.

*Sample.*—The sample, of approximately nine tons, was taken from the main seam, at the 6,400 ft. and 6,860 ft. levels, about 3,000 feet to the left of the slope, the inclination of the seam at that point being about 16°. The sample consisted of lump coal, prepared under the ordinary shipping conditions of the colliery; that is to say, screening over 1″ and then hand picking on a belt. Sampled March 27, 1907.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·55 | 89·4 | 9·8 | 10·6 | 50·8 |
| 2. | 1·45 | 81·0 | 8·4 | 19·0 | 40·2 |
| 3. | 1·38 | 77·1 | 7·3 | 22·9 | 34·6 |
| 4. | 1·32 | 58·3 | 6·2 | 41·6 | 25·8 |

The following results are obtained from the above data, and the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 77·0 | % ash | 7·3 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 12·0 | " " | 24·6 |
| 7. | Useful coal—sum of (5) and (6) | " " | 89·0 | " " | 9·7 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 11·0 | " " | 50·8 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 14·5 |
| 10. | " " " " " " | | | % sulphur | 2·5 |
| 11. | " " " " " " | | | Fuel Ratio | 2·46 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—This coal has a high proportion of innate ash, a moderate proportion of average bone coal, and a somewhat lower proportion than usual of light bone coal, low in ash. The refuse is moderate and rather high in ash. The ash, therefore, can not be greatly reduced by washing, but the sulphur, which is largely in the form of heavy material, is very considerably lowered.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | .... |
| 14. | 3·16 | 1·20 | 2·18 | .... | .... |
| 15. | 1·20 | 0·64 | 0·92 | .... | .... |
| 16. | 0·64 | 0·30 | 0·47 | .... | .... |
| 17. | 0·30 | 0·173 | 0·24 | .... | .... |
| 18. | 0·173 | 0·000 | 0·086 | .... | .... |

*Remarks.*—No screen analyses were made of this coal.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | 2809 | 16·5 | 1419 | 13·0 | .... | .... |
| 20. | Washed coal.... | 2467 | 11·8 | 1043 | 9·7 | .... | .... |
| 21. | Refuse—coarse.. | .... | .... | .... | .... | .... | .... |
| 22. | Hutch product.. | .... | .... | .... | .... | .... | .... |
| 23. | Jig slimes. ..... | .... | .... | .... | .... | .... | .... |
| 24. | Table slimes.... | .... | .... | .... | .... | .... | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal ........................ | wt. in lbs. | 4228 | % ash | 14·5 | % sulphur | 2·5 |
| 26. | Washed coal......................... | " " | 3469 | " " | 11·3 | " " | 1·3 |
| 27. | Refuse............................ | " " | 506 | " " | 36·0 | " " | .... |
| 28. | Other products...................... | " " | 126 | " " | .... | " " | .... |
| 29. | Loss.............................. | " " | 127 | " " | .... | " " | .... |
| 30. | Loss in % 3·0. | | | | | | |

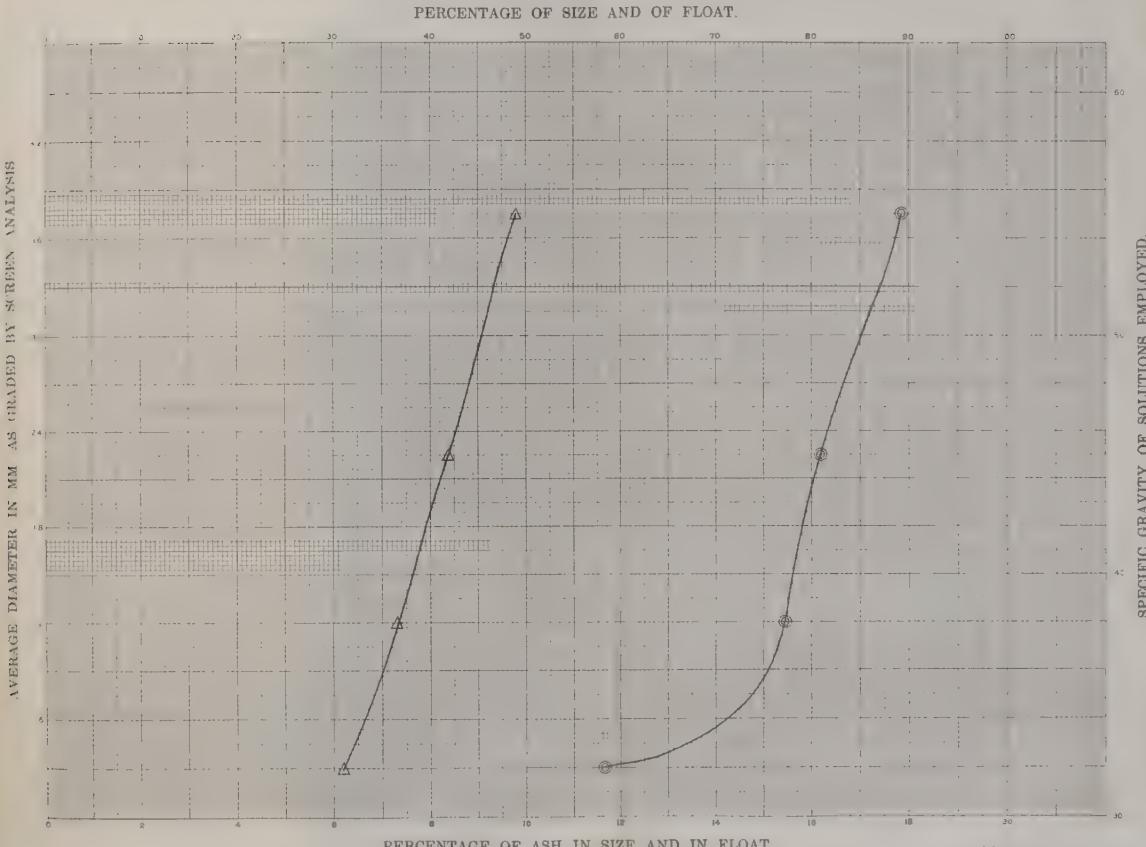
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. ..% | 82·0 | Ratio to standard | 92·1 |
| 32. | Reduction in ash...........................% | 22·1 | " " | 85·8 |
| 33. | " " sulphur. .......................% | 48·0 | " " | 85·7 |
| 34. | Increase in calorific value—calorimeter .........% | 4·6 | | |
| 35. | Increase in evaporation under boiler............% | 8·3 | | |
| 36. | Decrease in clinker under boiler................% | 35·3 | | |
| 37. | Fuel ratio of original coal..................... | 2·46 | | |
| 38. | " " washed " .................... | 2·50 | | |
| 39. | Calorific value of original coal.................. | 7200 | | |
| 40. | " " washed " ................. | 7530 | | |

*Remarks on Tables C, D, and E.*—The results of the washing trial check very well with the specific gravity tests, although the recovery of washed coal is smaller in quantity and the refuse contains more good coal than would be the case in large commercial operations. Owing to the large proportion of bone, it is impossible to make a very clean coal without great loss. A moderate degree of washing, however, greatly improves the material in respect of sulphur. It is probable, therefore, that washing, while justifiable as a preparation for cooking, will never be warranted for fuel purposes alone.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 3
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

# SPRINGHILL COAL FIELD.

## CUMBERLAND CO., NOVA SCOTIA.

ERRATUM

On the curve diagrams accompanying the tabulated records of each of the coals tested, is the following legend:—

LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

The above legend is incorrect; in each case it should read thus:—

○ Curve showing the relative quantities of the several sizes.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " material floating at the several densities.
△ " " " " " ash in " " " " " "

## COAL.—No. 5.

*Locality.*—Springhill, Cumberland county, N.S.

*Colliery.*—Cumberland Railway and Coal Co., No. 2 colliery.

*Sample.*—Eleven tons taken from one hundred feet on each side of the slope at the 3,800 ft. level. The sample consists of lump coal which had been cleaned by passing over a $\frac{3}{4}''$ screen, and by hand picking. Sampled April 1, 1907.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·52 | 91·0 | 5·7 | 9·0 | 41·8 |
| 2. | 1·44 | 86·7 | 5·2 | 13·3 | 33·8 |
| 3. | 1·375 | 81·0 | 5·1 | 19·0 | 29·0 |
| 4. | 1·310 | 55·0 | 3·4 | 45·0 | 16·0 |

The following results are obtained from the above data, and from the chemists results:—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 81·0 | % ash | 5·1 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 10·5 | " " | 14·7 |
| 7. | Useful coal—sum of (5) and (6) | " " | 91·5 | " " | 6·1 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 8·5 | " " | 47·3 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 9·2 |
| 10. | " " " " " " | | | % sulphur | 1·6 |
| 11. | " " " " " " | | | Fuel Ratio | 1·81 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—This coal has a moderate proportion of innate ash and but small proportions of refuse and bone coal, both of them comparatively low in ash. It is not well suited for washing, either for the reduction of ash or sulphur.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | .... |
| 14. | 3·16 | 1·20 | 2·18 | .... | .... |
| 15. | 1·20 | 0·64 | 0·92 | .... | .... |
| 16. | 0·64 | 0·30 | 0·47 | .... | .... |
| 17. | 0·30 | 0·173 | 0·24 | .... | .... |
| 18. | 0·173 | 0·000 | 0·086 | .... | .... |

*Remarks.*—No screen analyses were made.

TABLE C.

## Results of Washing (Details of Sizes.)

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | 3100 | 9·8 | 1575 | 8·6 | 472 | 8·4 |
| 20. | Washed coal.... | 2749 | 7·1 | 1473 | 6·2 | 216 | 5·6 |
| 21. | Refuse—coarse.. | .... | .... | .... | .... | .... | .... |
| 22. | Hutch product.. | .... | .... | .... | .... | .... | .... |
| 23. | Jig slimes. ..... | .... | .... | .... | .... | .... | .... |
| 24. | Table slimes.... | .... | .... | .... | .... | .... | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal ........................ | wt. in lbs. | 5419 | % ash | 9·2 | % sulphur | 1·6 |
| 26. | Washed coal........................ | " " | 4432 | " " | 7·1 | " " | 1·4 |
| 27. | Refuse............................ | " " | 563 | " " | 31·5 | " " | .... |
| 28. | Other products..................... | " " | 59 | " " | .... | " " | .... |
| 29. | Loss.............................. | " " | 95 | " " | .... | " " | .... |
| 30. | Loss in % 1·8. | | | | | | |

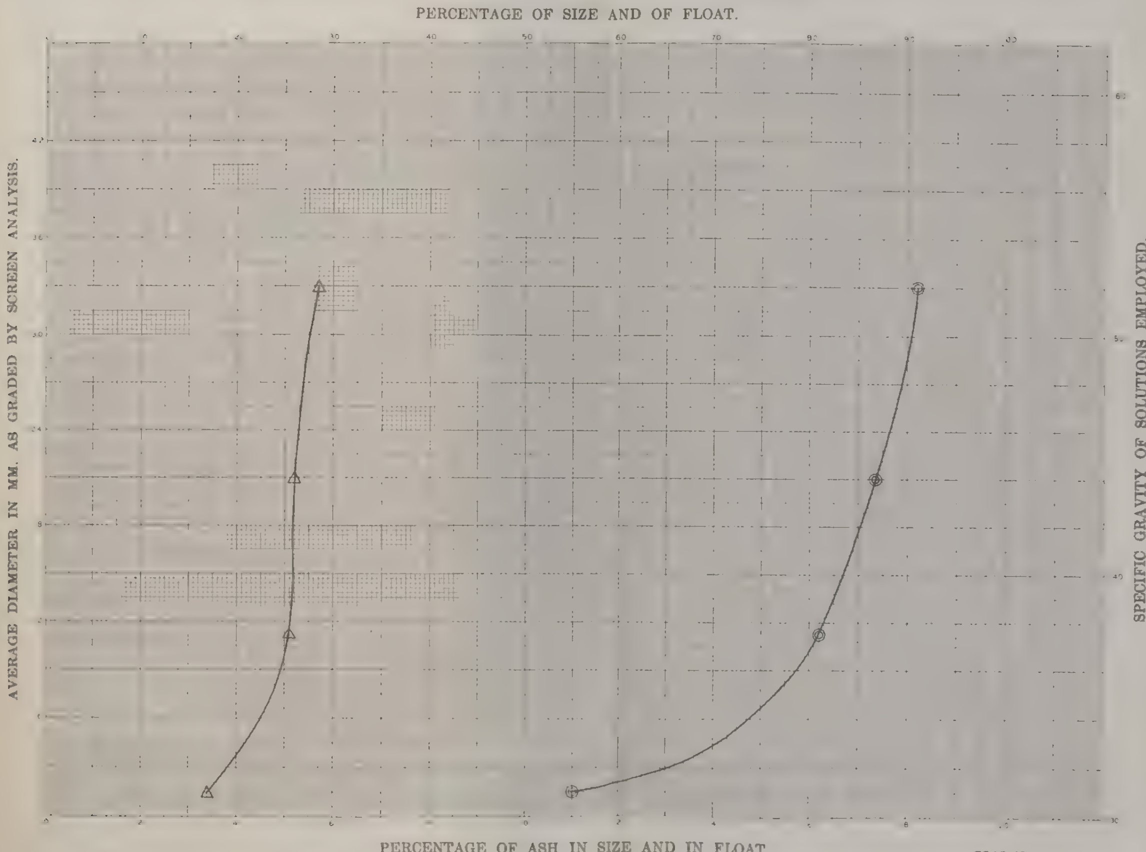
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone ... % | 81·6 | Ratio to standard | 89·2 |
| 32. | Reduction in ash.......................... % | 22·8 | " " | 85·9 |
| 33. | " " sulphur........................ % | 12·5 | " " | 66·6 |
| 34. | Increase in calorific value—calorimeter.......... % | 3·7 | | |
| 35. | Increase in evaporation under boiler............ % | 12·7 | | |
| 36. | Decrease in clinker under boiler................ % | 37·8 | | |
| 37. | Fuel ratio of original coal...................... | 1·81 | | |
| 38. | " " washed " ...................... | 1·81 | | |
| 39. | Calorific value of original coal.................. | 7430 | | |
| 40. | " " washed " ................. | 7700 | | |

*Remarks on Tables C, D, and E.*—The procedure in washing was normal and the results of the washing compare very well with those of the specific gravity determinations, although the recovery is lower and the refuse contains more fuel than would be the case in a commercial operation. The improvement due to washing is considerable, both as regards ash and sulphur, but it is improbable that washing would be commercially justifiable, as the coal is sufficiently good in the raw state.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities
" " " percentage of ash in each of the several sizes
◎ " " " " " " material floating at the several densities

COAL No. 5
APPENDIX I, VOL. III

## COAL.—No. 6.

*Locality.*—Springhill, Cumberland county, N.S.

*Colliery.*—Cumberland Railway and Coal Co., No. 3.

*Sample.*—Ten and a half tons were taken from three different levels, about three and a half tons coming from each of the following named localities : (*a*) 2,600 ft. level, about 3,500 feet west ; (*b*) 3,200 ft. level, about 3,500 feet west ; (*c*) 3,800 ft. level, both east and west. The sample was of lump coal, which had been cleaned by passing over a $\frac{3}{4}''$ screen, and then by hand picking. Sampled April 1, 1907.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·540............. | 89·7 | 7·0 | 10·3 | 48·2 |
| 2. | 1·445............. | 83·9 | 6·0 | 16·1 | 41·4 |
| 3. | 1·390............. | 81·5 | 5·7 | 18·5 | 35·6 |
| 4. | 1·325............. | 59·0 | 4·3 | 41·0 | 20·0 |

The following results are obtained from the above data, and the chemists results:—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375..................... | % yield | 80·0 | % ash | 5·4 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55..................... | " " | 10·0 | " " | 19·0 |
| 7. | Useful coal—sum of (5) and (6)..................... | " " | 90·0 | " " | 7·1 |
| 8. | Refuse, Sp. Gr. over 1·55..................... | " " | 10·0 | " " | 48·5 |
| 9. | Assay of original sample raw coal as sent to chemist.............. | | | " " | 11·5 |
| 10. | " " " " " " .............. | | | % sulphur | 1·8 |
| 11. | " " " " " " .............. | | | Fuel Ratio | 1·64 |
| 12. | Assay of mixed good and bone coal (5) and (6).................. | | | " " | .... |

*Remarks.*—This coal has a higher proportion of innate ash than the other sample from the same locality. It also contains a larger proportion of refuse. It is, therefore, more suitable for washing, although the sulphur would not be largely reduced.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | .... |
| 14. | 3·16 | 1·20 | 2·18 | .... | .... |
| 15. | 1·20 | 0·64 | 0·92 | .... | .... |
| 16. | 0·64 | 0·30 | 0·47 | .... | .... |
| 17. | 0·30 | 0·173 | 0·24 | .... | .... |
| 18. | 0·173 | 0·000 | 0·086 | .... | .... |

*Remarks.*—No screen analyses were made.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | 3481 | 11·5 | 1675 | 10·0 | 502 | 10·5 |
| 20. | Washed coal.... | 3105 | 8·15 | 1269 | 6·8 | 561 | 8·2 |
| 21. | Refuse—coarse.. | .... | .... | .... | .... | .... | .... |
| 22. | Hutch product.. | .... | .... | .... | .... | .... | .... |
| 23. | Jig slimes. ..... | .... | .... | .... | .... | .... | .... |
| 24. | Table slimes.... | .... | .... | .... | .... | .... | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 25. | Original coal ........................ | wt. in lbs. | 5658 | % ash | 11·5 | % sulphur | 1·8 |
| 26. | Washed coal........................ | " " | 4935 | " " | 8·3 | " " | 1·5 |
| 27. | Refuse............................ | " " | 410 | " " | 45·0 | " " | .... |
| 28. | Other products..................... | " " | 105 | " " | 9·4 | " " | .... |
| 29. | Loss.............................. | " " | 108 | " " | .... | " " | .... |
| 30. | Loss in % 1·9. | | | | | | |

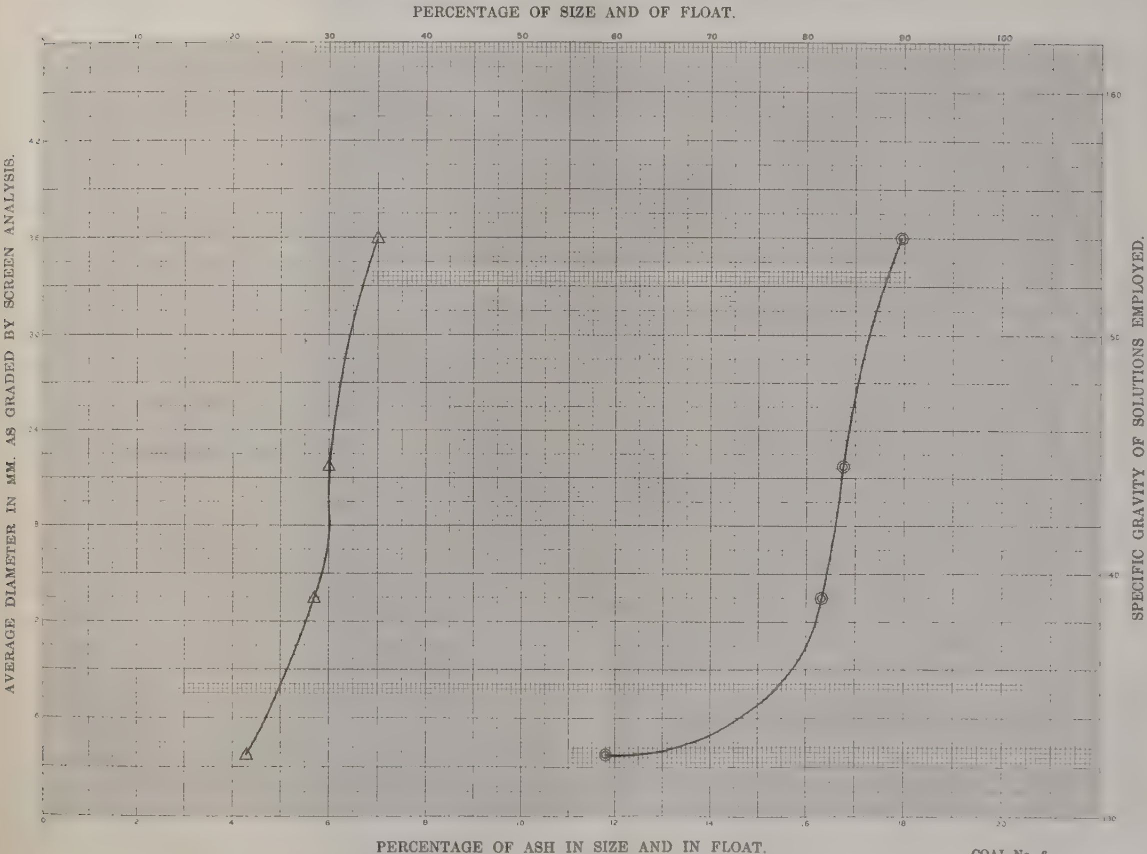
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone ...% | 87·0 | Ratio to standard | 96·7 |
| 32. | Reduction in ash.........................% | 27·8 | " " | 85·5 |
| 33. | " " sulphur..........................% | 16·7 | " " | 100·0 |
| 34. | Increase in calorific value—calorimeter..........% | 4·4 | | |
| 35. | Increase in evaporation under boiler.............% | 22·1 | | |
| 36. | Decrease in clinker under boiler................% | 36·4 | | |
| 37. | Fuel ratio of original coal...................... | 1·64 | | |
| 38. | " " washed " ..................... | 1·67 | | |
| 39. | Calorific value of original coal.................. | 7220 | | |
| 40. | " " washed " ................. | 7540 | | |

*Remarks on Tables C, D, and E.*—The procedure in washing was normal, and the results compare very well with the specific gravity determinations, although the recovery is lower, and the refuse contains more good coal than would be the case in a commercial operation. The improvement in the steaming quality of the coal, due to washing, is very considerable, being, in fact, more marked than in the case of any other coal from the district. It is questionable, however, whether even this improvement would justify washing for fuel purposes alone. It would, however, probably be commercially justifiable to screen and wash the coal if it were to be used for coke.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. 6
APPENDIX I, VOL. III

# JOGGINS-CHIGNECTO COAL FIELD.

## CUMBERLAND CO., NOVA SCOTIA.

### ERRATUM

On the curve diagrams accompanying the tabulated records of each of the coals tested, is the following legend:—

LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◉ " " " " " " " material floating at the several densities.

The above legend is incorrect; in each case it should read thus:—

○ Curve showing the relative quantities of the several sizes.
□ " " " percentage of ash in each of the several sizes.
◉ " " " " " material floating at the several densities.
△ " " " " " ash in " " " " " "

## COAL.—No. 7.

*Locality.*—Chignecto, Cumberland county, N.S.

*Colliery.*—Maritime Coal, Railway, and Power Co., Chignecto colliery.

*Sample.*—The sample of about six tons is said to have come from the 1,300 ft. level, but, as has been stated elsewhere, the representative of the Department was not present at the time the sample was taken. Sampled April 1, 1907.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·520 | 84·7 | 7·1 | 15·3 | 40·0 |
| 2. | 1·425 | 70·2 | 5·9 | 29·8 | 27·8 |
| 3. | 1·385 | 64·5 | 5·6 | 35·5 | 23·3 |
| 4. | 1·315 | 31·5 | 4·0 | 68·5 | 15·0 |

The following results are obtained from the above data, and the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 61·5 | % ash | 5·4 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 27·5 | " " | 12·9 |
| 7. | Useful coal—sum of (5) and (6) | " " | 89·0 | " " | 7·5 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 11·0 | " " | 40·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 13·3 |
| 10. | " " " " " " | | | % sulphur | 6·4 |
| 11. | " " " " " " | | | Fuel Ratio | 1·11 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—This coal contains a moderately high proportion of innate ash, a large proportion of bone coal rather low in ash, and a considerable proportion of refuse containing so little ash as to approximate a very poor grade of bone coal. The coal is also unusually high in sulphur, which is chiefly innate. The ash may be considerably reduced by washing, but the sulphur cannot be materially lowered.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | .... |
| 14. | 3·16 | 1·20 | 2·18 | .... | .... |
| 15. | 1·20 | 0·64 | 0·92 | .... | .... |
| 16. | 0·64 | 0·30 | 0·47 | .... | .... |
| 17. | 0·30 | 0·173 | 0·24 | .... | .... |
| 18. | 0·173 | 0·000 | 0·086 | .... | .... |

*Remarks.*—No screen analyses were made.

TABLE C.

**Results of Washing (Details of Sizes).**

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal . . . | 1625 | . . . . | 1117 | 10·5 | 293 | 12·7 |
| 20. | Washed coal. . . . | 1520 | 9·0 | 1196* | 8·7 | . . . . | . . . . |
| 21. | Refuse—coarse. . | 1304 | . . . . | . . . . | . . . . | . . . . | . . . . |
| 22. | Hutch product. . | . . . . | . . . . | . . . . | . . . . | . . . . | . . . . |
| 23. | Jig slimes. . . . . . | . . . . | . . . . | . . . . | . . . . | . . . . | . . . . |
| 24. | Table slimes. . . . | . . . . | . . . . | . . . . | . . . . | . . . . | . . . . |

TABLE D.

**Results of Washing (Totals).**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal . . . . . . . . . . . . . . . . . . . . . . . wt. in lbs. | 5734 | % ash | 13·3 | % sulphur | 6·4 |
| 26. | Washed coal. . . . . . . . . . . . . . . . . . . . . . . " " | 4956 | " " | 9·1 | " " | 6·2 |
| 27. | Refuse. . . . . . . . . . . . . . . . . . . . . . . . . . . . " " | 555 | " " | 31·0 | " " | . . . . |
| 28. | Other products. . . . . . . . . . . . . . . . . . . . . . " " | 77 | " " | 11·0 | " " | . . . . |
| 29. | Loss. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . " " | 146 | " " | . . . . | " " | . . . . |
| 30. | Loss in % 2·5. | | | | | |

TABLE E.

**Summary Statement of Effect of Washing on Fuel Values.**

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. . . % | 87·0 | Ratio to standard | 97·8 |
| 32. | Reduction in ash. . . . . . . . . . . . . . . . . . . . . . . . . . . % | 31·5 | " " | 82·5 |
| 33. | " " sulphur. . . . . . . . . . . . . . . . . . . . . . . . . % | 3·1 | " " | 20·0 |
| 34. | Increase in calorific value—calorimeter . . . . . . . . . % | 6·1 | | |
| 35. | Increase in evaporation under boiler. . . . . . . . . . . . % | 11·2 | | |
| 36. | Decrease in clinker under boiler. . . . . . . . . . . . . . . . % | 34·3 | | |
| 37. | Fuel ratio of original coal. . . . . . . . . . . . . . . . . . . . . . | 1·11 | | |
| 38. | " " washed " . . . . . . . . . . . . . . . . . . . . . | 1·20 | | |
| 39. | Calorific value of original coal. . . . . . . . . . . . . . . . . . | 6750 | | |
| 40. | " " washed " . . . . . . . . . . . . . . . . . | 7160 | | |

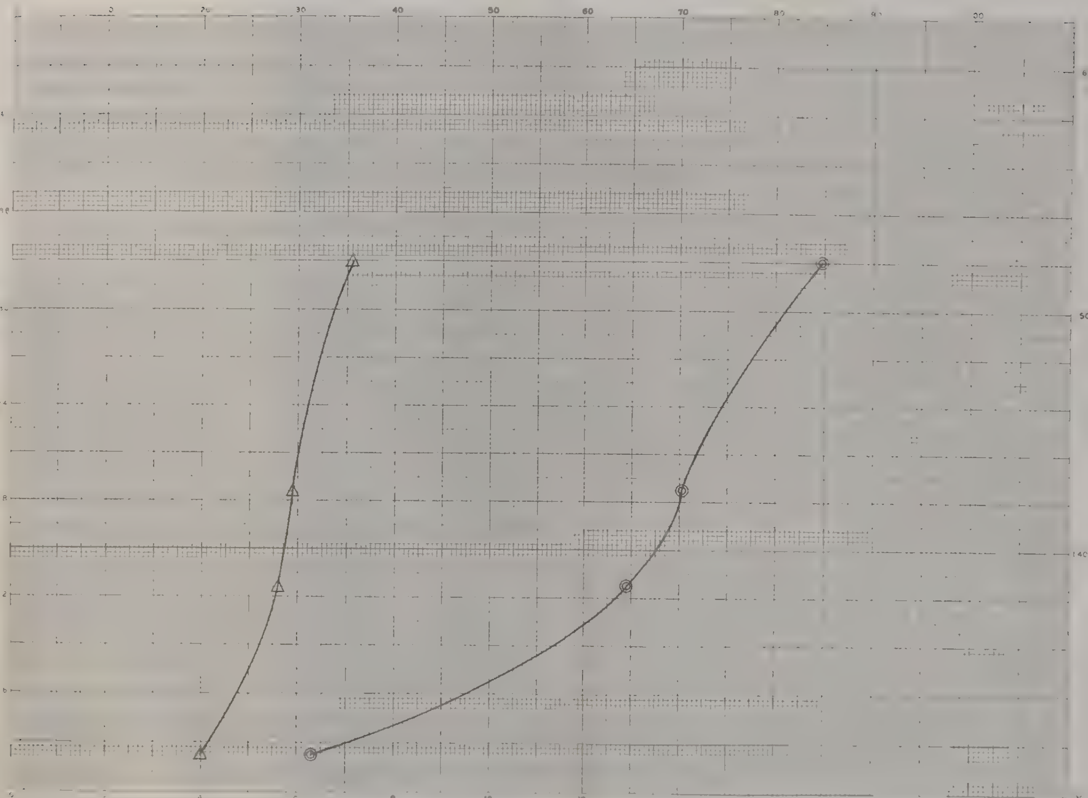
*Remarks on Tables C, D, and E.*—The procedure adopted in washing this coal differed from the standard, as it was deemed desirable to compare two different methods. A portion of the coal was all crushed to pass ½″, and was then sized into three lots—½″ to ¼″, ¼″ to ⅛″, and ⅛″ to 0, and each size washed separately. The second portion of the sample was washed in the ordinary manner. The results reported above were obtained by combining the products of both experiments.

The result of the washing trials compares fairly well with those from the specific gravity tests, but in the case of this particular coal it is evident that maximum density adopted as a standard (namely 1·55) is too low, as the material sinking at that point contains less ash than with other eastern coals.

The possible reduction of ash and sulphur, even under ideal circumstances, is, however, small, and it is improbable that washing will be commercially justifiable.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.

PERCENTAGE OF SIZE AND OF FLOAT.




PERCENTAGE OF ASH IN SIZE AND IN FLOAT.

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. 7
Appendix I, Vol. III

## COAL.—No. 9.

*Locality.*—River Hebert, Cumberland county, N.S.

*Colliery.*—Minudie Coal Co., Minudie colliery.

*Sample.*—Six and a quarter tons were taken in approximately equal quantities from the 500, 800, 1,000, and 1,200 ft. levels, on both sides of the slope. The sample was of lump coal which had been passed over a $\frac{3}{4}''$ screen and then hand picked. Sampled April 2, 1907.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·52 | 75·5 | 5·8 | 24·5 | 43·0 |
| 2. | 1·42 | 67·4 | 5·3 | 32·6 | 37·5 |
| 3. | 1·375 | 57·2 | 4·6 | 42·8 | .... |
| 4. | 1·315 | 45·3 | 3·5 | 54·6 | .... |

The following results are obtained from the above data, and the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 57·2 | % ash | 4·6 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 19·1 | " " | 9·7 |
| 7. | Useful coal—sum of (5) and (6) | " " | 76·3 | " " | 5·9 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 23·7 | " " | 45·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 15·5 |
| 10. | " " " " " " | | | % sulphur | 6·7 |
| 11. | " " " " " " | | | Fuel Ratio | 1·37 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—This coal has a medium proportion of innate ash and a large proportion of bone and refuse, both low in ash. The coal is a difficult one to wash, owing to its physical character, but under careful treatment it should be considerably improved as regards ash. The sulphur is largely innate and cannot be materially reduced.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | .... |
| 14. | 3·16 | 1·20 | 2·18 | .... | .... |
| 15. | 1·20 | 0·64 | 0·92 | .... | .... |
| 16. | 0·64 | 0·30 | 0·47 | .... | .... |
| 17. | 0·30 | 0·173 | 0·24 | .... | .... |
| 18. | 0·173 | 0·000 | 0·086 | .... | .... |

*Remarks.*—No screen analyses were made.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | 43·25 | 19·0* | 16·26 | 15·2* | .... | .... |
| 20. | Washed coal.... | 37·27 | 12·8 | 12·08 | 10·0 | .... | .... |
| 21. | Refuse—coarse.. | ..... | .... | ..... | .... | .... | .... |
| 22. | Hutch product.. | ..... | .... | ..... | .... | .... | .... |
| 23. | Jig slimes...... | ..... | .... | ..... | .... | .... | .... |
| 24. | Table slimes.... | ..... | .... | ..... | .... | .... | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 25. | Original coal ........................ | wt. in lbs. | 5951 | % ash | 15·5 | % sulphur | 6·7 |
| 26. | Washed coal........................ | " " | 4935 | " " | 11·0 | " " | 6·3 |
| 27. | Refuse........................... | " " | 730 | " " | 49·5 | " " | .... |
| 28. | Other products.................... | " " | 120 | " " | 26·7 | " " | .... |
| 29. | Loss............................. | " " | 166 | " " | .... | " " | .... |

30. Loss in % 2·8.

TABLE E.

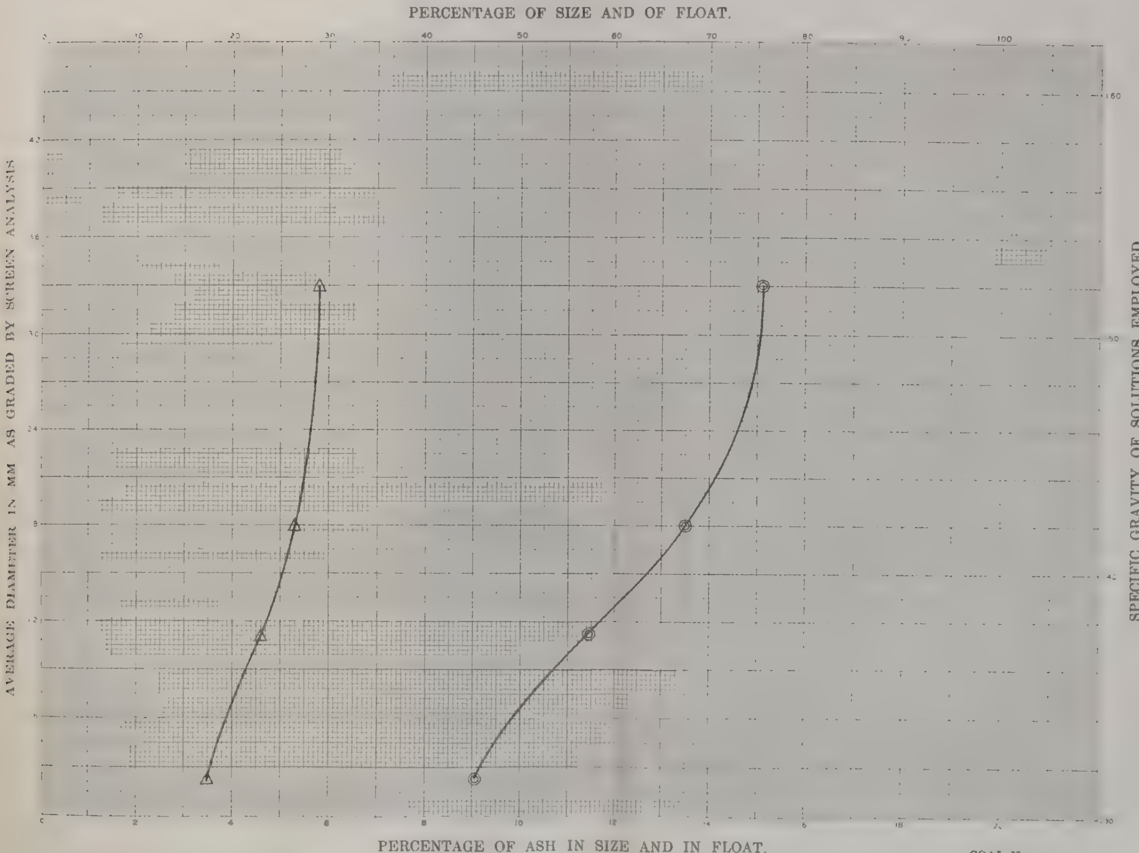
## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone ..% | 79·4 | Ratio to standard | 104·1 |
| 32. | Reduction in ash...........................% | 29·0 | " " | 53·7 |
| 33. | " " sulphur.........................% | 6·0 | " " | 14·3 |
| 34. | Increase in calorific value—calorimeter.........% | 6·5 | | |
| 35. | Increase in evaporation under boiler...........% | 9·3 | | |
| 36. | Decrease in clinker under boiler................% | 3·6 | | |
| 37. | Fuel ratio of original coal..................... | 1·37 | | |
| 38. | " " washed " ..................... | 1·38 | | |
| 39. | Calorific value of original coal.................. | 6570 | | |
| 40. | " " washed " ................ | 7000 | | |

*Remarks on Tables C, D, and E.*—This coal was the first one washed in the regular series, and for this reason, as well as because of its extremely difficult character. the main test was preceded by a preliminary run, the two being carried out under somewhat different conditions. In the preliminary tests, the coal was crushed to 1″ and made into three sizes, of which the large and medium only were washed, the fines being discarded. In the second test, the coal was also crushed to 1″, but only two sizes were made—coarse and fine, both being washed. The washed coal from both tests was mixed for analysis and the results published above are made up from the combined products. The result of the washing does not compare at all favourably with the results of the specific gravity tests, owing to the fact that the impurities in this coal are distributed in numerous, very thin streaks, so that it is scarcely possible to find any lumps of really clean coal. The washing was necessarily done of comparatively coarse material; that is to say, from 1″, whereas the specific gravity tests were made with a coal which had been all crushed to very fine powder.

If the coal were suitable for coking, it could, of course, be crushed fine before washing, and thus a much greater improvement could be effected, but the high proportion of organic sulphur renders coking out of the question, and washing merely for fuel purposes does not seem to be justifiable.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. 9
APPENDIX I, VOL. III

## COAL.—No. 10.

*Locality.*—Joggins, Cumberland county, N.S.

*Colliery.*—Canada Coal and Railway Co., Joggins colliery, Joggins mine.

*Sample.*—About six tons were taken from the 3,100 ft. level, both east and west of the main slope. The sample consisted of lump coal which had been passed over a $\frac{3}{4}''$ screen and then hand picked. Sampled April 3, 1907.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·550............. | 78·5 | 7·8 | 21·5 | 53·0 |
| 2. | 1·435............. | 72·0 | 7·2 | 28·0 | 42·9 |
| 3. | 1·360............. | 57·0 | 5·6 | 43·0 | .... |
| 4. | 1·325............. | 28·0 | 5·5 | 72·0 | 22·9 |

The following results are obtained from the above data, and the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375...................... | % yield | 61·5 | % ash | 6·4 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55..................... | " " | 17·0 | " " | 13·0 |
| 7. | Useful coal—sum of (5) and (6)..................... | " " | 78·5 | " " | 7·8 |
| 8. | Refuse, Sp. Gr. over 1·55 .......................... | " " | 21·5 | " " | 53·0 |
| 9. | Assay of original sample raw coal as sent to chemist............... | | | " " | 18·6 |
| 10. | " " " " " " ............... | | | % sulphur | 5·4 |
| 11. | " " " " " " ............... | | | Fuel Ratio | 1·22 |
| 12. | Assay of mixed good and bone coal (5) and (6).................. | | | " " | .... |

*Remarks.*—This coal has a high proportion of innate ash, a medium proportion of bone, rather low in ash, and a large proportion of refuse. It is somewhat difficult coal to wash, but by suitable treatment the ash can be considerably reduced and the sulphur somewhat lowered.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | .... |
| 14. | 3·16 | 1·20 | 2·18 | .... | .... |
| 15. | 1·20 | 0·64 | 0·92 | .... | .... |
| 16. | 0·64 | 0·30 | 0·47 | .... | .... |
| 17. | 0·30 | 0·173 | 0·24 | .... | .... |
| 18. | 0·173 | 0·000 | 0·086 | .... | .... |

*Remarks.*—No complete series of screen analyses was made, but enough work was done to show that the refuse is softer than the coal, and that the screenings are, therefore, high in ash.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | 3360 | 15·8 | 1340 | 15·3 | 500 | 20·7 |
| 20. | Washed coal.... | 2717 | 11·1 | 986 | 8·6 | 390 | 10·5 |
| 21. | Refuse—coarse.. | .... | .... | .... | .... | .... | .... |
| 22. | Hutch product.. | .... | .... | .... | .... | .... | .... |
| 23. | Jig slimes...... | .... | .... | .... | .... | .... | .... |
| 24. | Table slimes.... | .... | .... | .... | .... | .... | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 25. | Original coal ........................ | wt. in lbs. | 5200 | % ash | 18·6 | % sulphur | 5·4 |
| 26. | Washed coal........................ | “ “ | 4093 | “ “ | 10·3 | “ “ | 4·8 |
| 27. | Refuse........................ | “ “ | 983 | “ “ | 46·0 | “ “ | .... |
| 28. | Other products........................ | “ “ | 60 | “ “ | 15·1 | “ “ | .... |
| 29. | Loss........................ | “ “ | 64 | “ “ | .... | “ “ | .... |

30. Loss in % 1·2.

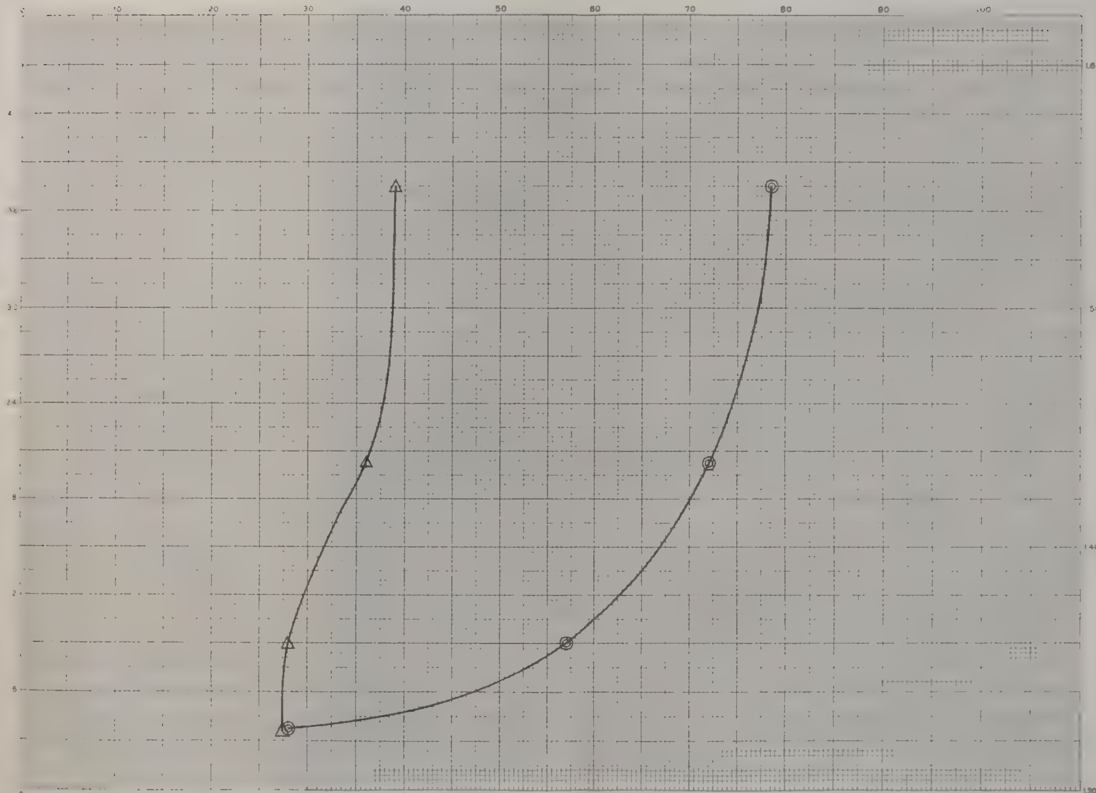
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | | |
|---|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. . . % | 78·7 | Ratio to standard | 100·2 |
| 32. | Reduction in ash.......................... % | 44·6 | “ “ | 75·7 |
| 33. | “ “ sulphur.......................... % | 11·2 | “ “ | 46·1 |
| 34. | Increase in calorific value—calorimeter.......... % | 9·9 | | |
| 35. | Increase in evaporation under boiler............ % | 10·8 | | |
| 36. | Decrease in clinker under boiler................ % | 53·6 | | |
| 37. | Fuel ratio of original coal...................... | 1·22 | | |
| 38. | “ “ washed “ .................... | 1·38 | | |
| 39. | Calorific value of original coal.................. | 6440 | | |
| 40. | “ “ washed “ ................ | 7080 | | |

*Remarks on Tables C, D, and E.*—The procedure adopted in washing was normal, except that the finest size was jigged on a bed of refuse from the screened size. The results of the washing compare fairly well with those of the specific gravity tests, although the recovery of washed coal is less and the refuse contains less ash than would be the case in a continuous commercial operation. Attention should be called to the distribution of ash in this coal, the smaller sizes showing a very high ash content. The coal is unsuitable for the manufacture of coke, owing to its high organic sulphur, which cannot be removed by washing, and although its steaming qualities are improved, and the proportion of ash and clinker greatly reduced, it is improbable that there is commercial justification for washing. It is, however, quite possible that the screenings from this coal might be washed with advantage.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. 10
APPENDIX I, VOL. III

# GRAND LAKE COAL FIELD.

## QUEENS CO., NEW BRUNSWICK.

### ERRATUM

On the curve diagrams accompanying the tabulated records of each of the coals tested, is the following legend:—

LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " material floating at the several densities.

The above legend is incorrect; in each case it should read thus:—

○ Curve showing the relative quantities of the several sizes.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " material floating at the several densities.
△ " ' " " " ash in " " " " " "

## COAL.—No. 11.

*Locality.*—Minto, N.B.

*Colliery.*—King's mine.

*Sample.*—A sample of about eleven tons which consisted of lump coal, was taken from different parts of the mine. It was cleaned by passing over a $\frac{3}{4}''$ screen, and was roughly hand picked during loading. April 8, 1907.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·530 | 75·0 | 6·8 | 25·0 | 36·9 |
| 2. | 1·430 | 65·7 | 5·9 | 34·3 | .... |
| 3. | 1·370 | 55·7 | 4·3 | 44·3 | 27·3 |
| 4. | 1·310 | 43·5 | 3·7 | 56·5 | 22·5 |

The following results are obtained from the above data, and the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 56·8 | % ash | 4·4 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 19·2 | " " | 15·1 |
| 7. | Useful coal—sum of (5) and (6) | " " | 76·0 | " " | 6·9 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 24·0 | " " | 38·6 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 14·4 |
| 10. | " " " " " " | | | % sulphur | 5·8 |
| 11. | " " " " " " | | | Fuel Ratio | 1·66 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—This coal has a moderate proportion of innate ash, and a large proportion of bone and refuse, both low in ash. Washing will not improve it much, unless a very considerable proportion of the material is wasted as refuse. The sulphur is not materially reduced by washing.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | .... |
| 14. | 3·16 | 1·20 | 2·18 | .... | .... |
| 15. | 1·20 | 0·64 | 0·92 | .... | .... |
| 16. | 0·64 | 0·30 | 0·47 | .... | .... |
| 17. | 0·30 | 0·173 | 0·24 | .... | .... |
| 18. | 0·173 | 0·000 | 0·086 | .... | .... |

*Remarks.*—No screen analyses were made.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal . . . | 4258 | 13·9 | 1357 | 13·2 | .... | .... |
| 20. | Washed coal.... | 3590 | 10·2 | 1034 | 8·0 | .... | .... |
| 21. | Refuse—coarse.. | .... | .... | .... | .... | .... | .... |
| 22. | Hutch product.. | .... | .... | .... | .... | .... | .... |
| 23. | Jig slimes...... | .... | .... | .... | .... | .... | .... |
| 24. | Table slimes.... | .... | .... | .... | .... | .... | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal ........................ | wt. in lbs. | 5615 | % ash | 14·4 | % sulphur | 5·8 |
| 26. | Washed coal.......................... | " " | 4624 | " " | 9·4 | " " | 4·9 |
| 27. | Refuse............................... | " " | 862 | " " | 38·8 | " " | .... |
| 28. | Other products...................... | " " | 40 | " " | 15·3 | " " | .... |
| 29. | Loss................................. | " " | 89 | " " | .... | " " | .... |
| 30. | Loss in % 1·6. | | | | | | |

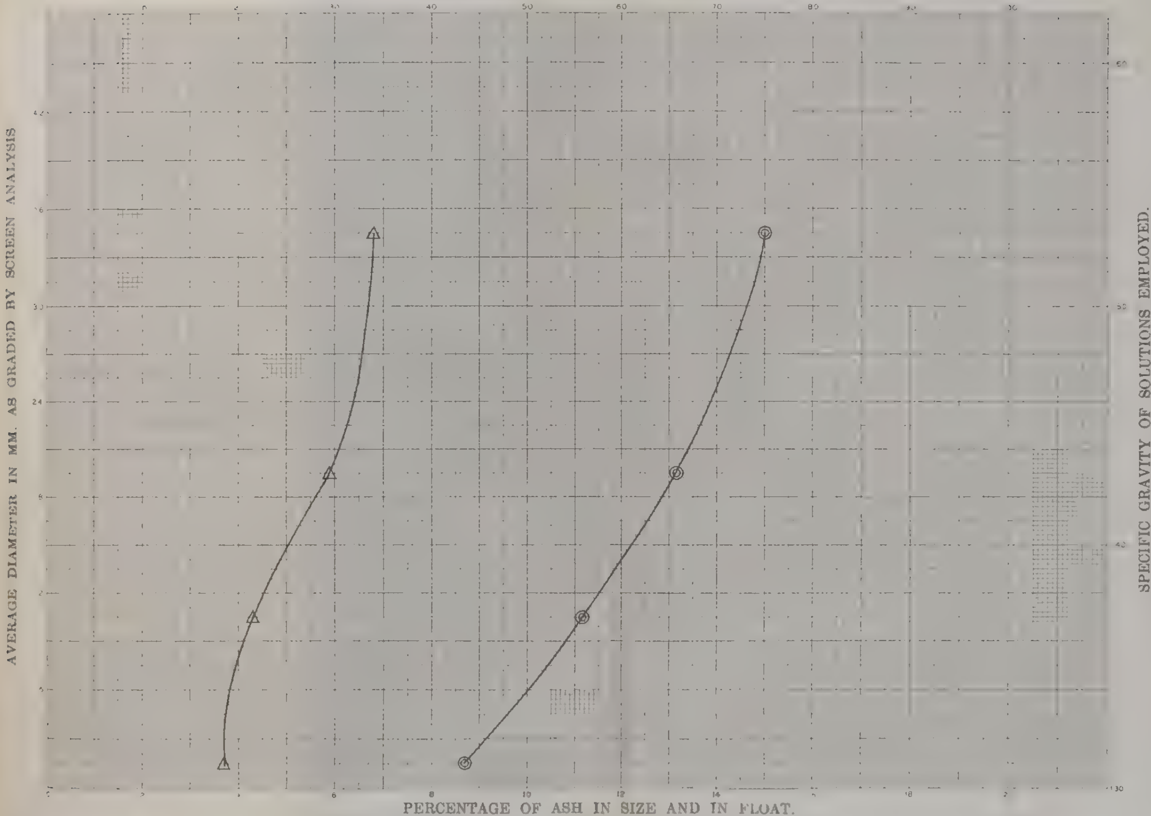
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. . .% | 82·4 | Ratio to standard | 107·1 |
| 32. | Reduction in ash ...........................% | 34·7 | " " | 73·4 |
| 33. | " " sulphur. ...........................% | 15·5 | " " | 59·2 |
| 34. | Increase in calorific value—calorimeter .........% | 7·3 | | |
| 35. | Increase in evaporation under boiler............% | 13·7 | | |
| 36. | Decrease in clinker under boiler................% | 18·3 | | |
| 37. | Fuel ratio of original coal...................... | 1·66 | | |
| 38. | " " washed " ..................... | 1·66 | | |
| 39. | Calorific value of original coal.................. | 7160 | | |
| 40. | " " washed " ................. | 7680 | | |

*Remarks on Tables C, D, and E.*—The procedure in washing differed from the normal in that only two sizes were made ; *i.e.*, over and under ½″, but the results of the trials agreed fairly well with those of the specific gravity tests. The coal is extremely compact and hard, and quite different in character from the other eastern coals, and it is doubtful whether the standard adopted for refuse is quite suitable in this case, as the ash in the material sinking at 1·55 specific gravity is unusually low. It is improbable, however, that even a change in the standard would result in a commercially successful washing, as the coal is unsuitable for coking on account of its high organic sulphur, and the improvement in fuel values is scarcely enough to justify treatment.

## GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

Curve showing the relative quantities of the several sizes
" " " " " " " " densities.
" " " percentage of ash in each of the several sizes.
" " " " " " " material floating at the several densities.

COAL No. 11
APPENDIX I, VOL. III

# ALBERTA AND SASKATCHEWAN LIGNITE FIELDS.

## SOURIS-ESTEVAN FIELD, SASK.

### ERRATUM

On the curve diagrams accompanying the tabulated records of each of the coals tested, is the following legend:—

LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.<br>
△ “ “ “ “ “ “ “ “ densities.<br>
□ “ “ “ percentage of ash in each of the several sizes.<br>
◎ “ “ “ “ “ “ “ material floating at the several densities.

The above legend is incorrect; in each case it should read thus:—

○ Curve showing the relative quantities of the several sizes.<br>
□ “ “ “ percentage of ash in each of the several sizes.<br>
◎ “ “ “ “ “ material floating at the several densities.<br>
△ “ “ “ “ “ ash in “ “ “ “ “ “

## COAL.—No. 40.

*Locality.*—Taylorton, Sask.

*Colliery.*—Western Dominion collieries.

*Sample.*—A sample of fifty sacks was taken from development work on July 11, 1908. An additional sample of seventy-five sacks was taken on August 23. The seam is very clean, and the coal is graded as domestic lump. Sampled July 11, 1908.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·540 | 94·3 | 7·2 | 5·8 | 24·7 |
| 2. | 1·430 | 21·8 | 7·0 | 78·2 | 10·5 |
| 3. | 1·380 | 3·4 | .... | 96·6 | 8·9 |
| 4. | 1·330 | .... | .... | 100·0 | 8·2 |

The following results are obtained from the above data, and the chemists reports :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | .... | % ash | .... |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 95·0 | " " | 7·2 |
| 7. | Useful coal—sum of (5) and (6) | " " | 95·0 | " " | 7·2 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 5·0 | " " | 25·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 8·1 |
| 10. | " " " " " " | | | % sulphur | 0·6 |
| 11. | " " " " " " | | | Fuel Ratio | 0·88 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 0·74 |

*Remarks.*—This sample is a heavy and homogeneous lignite, which would be but little improved by washing.

### TABLE B.

### Screen Analysis.

| | Maximun Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 37·5 | 6·5 |
| 14. | 3·16 | 1·20 | 2·18 | 27·4 | 7·2 |
| 15. | 1·20 | 0·64 | 0·92 | 14·6 | 6·4 |
| 16. | 0·64 | 0·30 | 0·47 | 8·2 | 6·4 |
| 17. | 0·30 | 0·173 | 0·24 | 6·4 | 7·5 |
| 18. | 0·173 | 0·000 | 0·086 | 5·9 | 9·0 |

*Remarks.*—The coal is fairly homogeneous, but contains a small amount of weak refuse material. The coal itself is of medium strength when freshly mined, but gives up its water and crumbles if left for any length of time exposed to the air.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | This lignite was not washed. | | | | | |
| 20. | Washed coal.... | | | | | | |
| 21. | Refuse—coarse.. | | | | | | |
| 22. | Hutch product.. | | | | | | |
| 23. | Jig slimes. .... | | | | | | |
| 24. | Table slimes.... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal ...................... | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. | Washed coal...................... | " " | .... | " " | .... | " " | .... |
| 27. | Refuse........................... | " " | .... | " " | .... | " " | .... |
| 28. | Other products..................... | " " | .... | " " | .... | " " | .... |
| 29. | Loss............................. | " " | .... | " " | .... | " " | .... |
| 30. | Loss in % .... | | | | | | |

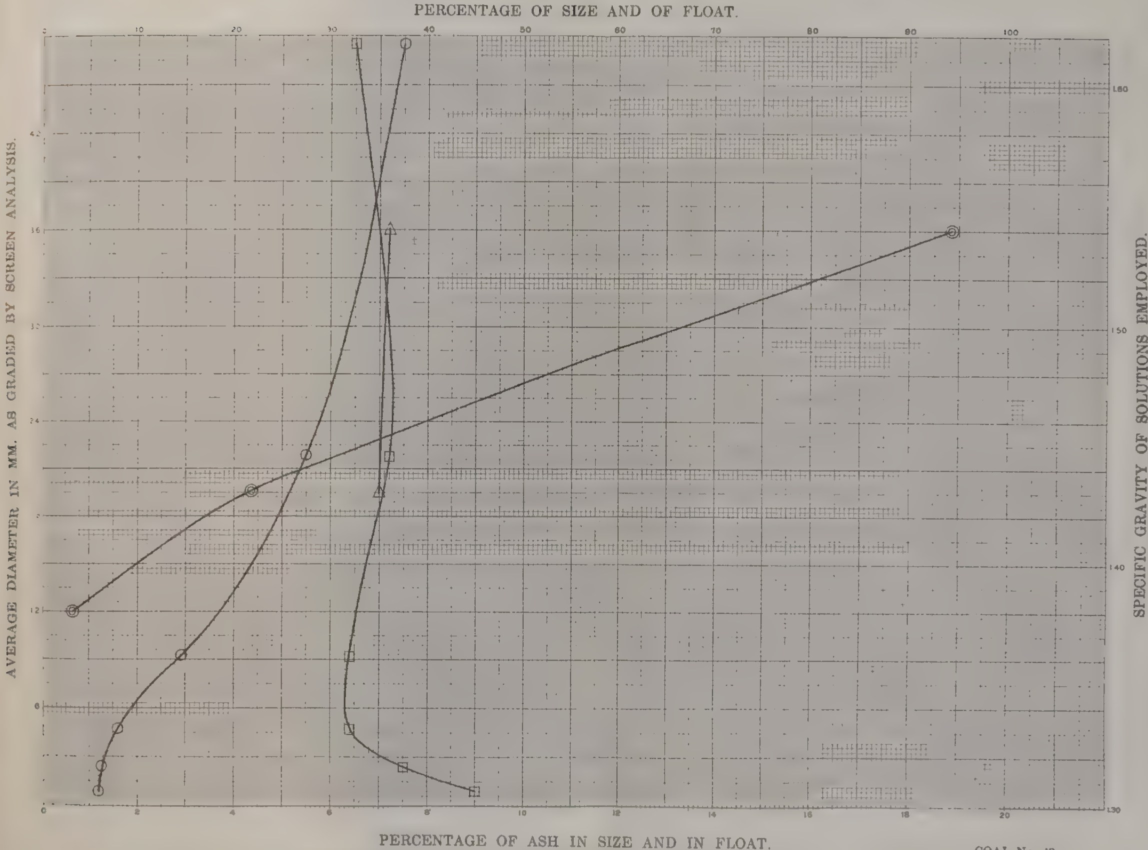
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | | |
|---|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone.... | % | .... | Ratio to standard | .... |
| 32. | Reduction in ash............................ | % | .... | " " | .... |
| 33. | " " sulphur......................... | % | .... | " " | .... |
| 34. | Increase in calorific value—calorimeter ......... | % | .... | | |
| 35. | Increase in evaporation under boiler............ | % | .... | | |
| 36. | Decrease in clinker under boiler................ | % | .... | | |
| 37. | Fuel ratio of original coal....................... | | .... | | |
| 38. | " " washed " ..................... | | .... | | |
| 39. | Calorific value of original coal.................. | | .... | | |
| 40. | " " washed " ................. | | .... | | |

*Remarks on Tables C, D, and E.*—None of the lignites were washed.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

Curve showing the relative quantities of the several sizes.
△ " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. 40
APPENDIX I, VOL. III

## COAL.—No. 41.

*Locality.*—Estevan, Sask.

*Colliery.*—Eureka Coal and Brick Co.

*Sample.*—A sample of twenty-five sacks was taken from the cars as they were loaded. There is no equipment for screening, and the coal is a good quality of run of mine. Sampled July 11, 1908.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·520............. | 48·0 | 8·0 | 52·0 | 21·8 |
| 2. | 1·410............. | 16·5 | 3·0 | 83·4 | 16·8 |
| 3. | 1·370............. | 0·0 | .... | 100·0 | 16·3 |
| 4. | 1·320............. | 0·0 | .... | 100·0 | 16·1 |

The following results are obtained from the above data, and the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375........................ | % yield | .... | % ash | .... |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55........................ | " " | .... | " " | .... |
| 7. | Useful coal—sum of (5) and (6)........................ | " " | .... | " " | .... |
| 8. | Refuse, Sp. Gr. over 1·55 ........................... | " " | .... | " " | .... |
| 9. | Assay of original sample raw coal as sent to chemist................ | | | " " | 16·8 |
| 10. | " " " " " " ............... | | | % sulphur | 0·5 |
| 11. | " " " " " " ............... | | | Fuel Ratio | 1·08 |
| 12. | Assay of mixed good and bone coal (5) and (6)..................... | | | " " | 0·98 |

*Remarks.*—This coal is of exceedingly high specific gravity, and is virtually all bone if classified by the same standards as bituminous coal. The amount of actual refuse is, however, very low, and washing would be quite useless.

### TABLE B.

### Screen Analysis.

| | Maximun Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 56·3 | 11·4 |
| 14. | 3·16 | 1·20 | 2·18 | 23·4 | 12·4 |
| 15. | 1·20 | 0·64 | 0·92 | 10·2 | 13·2 |
| 16. | 0·64 | 0·30 | 0·47 | 4·6 | 14·4 |
| 17. | 0·30 | 0·173 | 0·24 | 2·9 | 15·7 |
| 18. | 0·173 | 0·000 | 0·086 | 2·6 | 18·9 |

*Remarks.*—This lignite is reasonably strong when mined, and stands handling and shipment very well, but it crumbles to dust on prolonged exposure to the air, owing to the drying out of the moisture.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal . . . | This lignite was not washed. | | | | | |
| 20. | Washed coal. . . . | | | | | | |
| 21. | Refuse—coarse. . | | | | | | |
| 22. | Hutch product. . | | | | | | |
| 23. | Jig slimes. . . . . . | | | | | | |
| 24. | Table slimes. . . . | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal . . . . . . . . . . . . . . . . . . . . . . . | wt. in lbs. | . . . . | % ash | . . . . | % sulphur | . . . . |
| 26. | Washed coal. . . . . . . . . . . . . . . . . . . . . . . . | " " | . . . . | " " | . . . . | " " | . . . . |
| 27. | Refuse. . . . . . . . . . . . . . . . . . . . . . . . . . . . | " " | . . . . | " " | . . . . | " " | . . . . |
| 28. | Other products. . . . . . . . . . . . . . . . . . . . . | " " | . . . . | " " | . . . . | " " | . . . . |
| 29. | Loss. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | " " | . . . . | " " | . . . . | " " | . . . . |
| 30. | Loss in % . . . . | | | | | | |

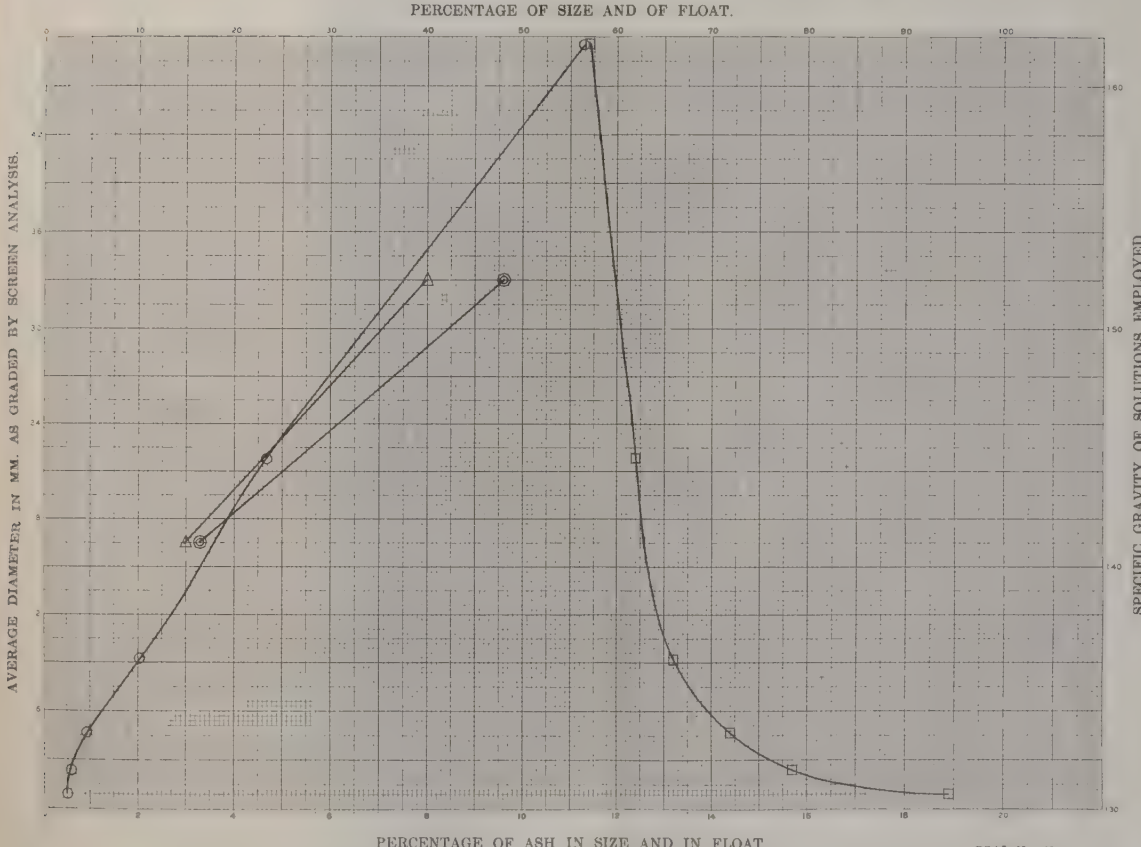
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | | |
|---|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. . . . % | . . . . | Ratio to standard | . . . . |
| 32. | Reduction in ash. . . . . . . . . . . . . . . . . . . . . . . . . . . % | . . . . | " " | . . . . |
| 33. | " " sulphur. . . . . . . . . . . . . . . . . . . . . . . . % | . . . . | " " | . . . . |
| 34. | Increase in calorific value—calorimeter. . . . . . . . . . % | | | |
| 35. | Increase in evaporation under boiler. . . . . . . . . . . . % | . . . . | | |
| 36. | Decrease in clinker under boiler. . . . . . . . . . . . . . . . % | . . . . | | |
| 37. | Fuel ratio of original coal. . . . . . . . . . . . . . . . . . . . . . | . . . . | | |
| 38. | " " washed " . . . . . . . . . . . . . . . . . . . . . | . . . . | | |
| 39. | Calorific value of original coal. . . . . . . . . . . . . . . . . . | . . . . | | |
| 40. | " " washed " . . . . . . . . . . . . . . . . . . | . . . . | | |

*Remarks on Tables C, D, and E.*—None of the lignites were washed.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 41
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

# EDMONTON FIELD, ALBERTA.

ERRATUM

On the curve diagrams accompanying the tabulated records of each of the coals tested, is the following legend:—

LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " material floating at the several densities.

The above legend is incorrect; in each case it should read thus:—

○ Curve showing the relative quantities of the several sizes.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " material floating at the several densities.
△ " " " " " ash in " " " " " "



83—6

## COAL.—No. 46.

*Locality.*—Strathcona, Alberta.

*Colliery.*—Strathcona Coal Co.

*Sample.*—The sample of twenty-five sacks was drawn from the bin, ten sacks being of nut coal, screened over $1\frac{1}{2}''$ bars, and fifteen sacks of lump coal, over $2\frac{1}{2}''$ bars. The coal is drawn from the north side of the shaft, about one hundred feet from the outcrop. It is stated to be of poorer quality than that south of the shaft, but it was impossible to secure a sample of the latter. Sampled July 16, 1908.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·525 | 89·2 | 7·5 | 10·8 | 44·4 |
| 2. | 1·410 | 36·5 | 5·8 | 63·5 | 14·5 |
| 3. | 1·370 | 1·1 | ... | 98·9 | 12·3 |
| 4. | 1·315 | 0·0 | ... | 100·0 | 11·6 |

The following results are obtained from the above data, and the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | .... | % ash | .... |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 97·0 | " " | 7·8 |
| 7. | Useful coal—sum of (5) and (6) | " " | 97·0 | " " | 7·8 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 3·0 | " " | 57·8 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 11·4 |
| 10. | " " " " " " | | | % sulphur | 0·4 |
| 11. | " " " " " " | | | Fuel Ratio | 1·16 |
| 12. | Assay of mixed good and bone coal (5) and (6) above | | | " " | 1·19 |

*Remarks.*—This coal, like the other Alberta lignites, is not suitable for washing, although it could be improved more than the others from the same district.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 47·8 | 10·0 |
| 14. | 3·16 | 1·20 | 2·18 | 27·2 | 9·2 |
| 15. | 1·20 | 0·64 | 0·92 | 14·0 | 9·8 |
| 16. | 0·64 | 0·30 | 0·47 | 5·6 | 9·4 |
| 17. | 0·30 | 0·173 | 0·24 | 3·1 | 10·5 |
| 18. | 0·173 | 0·000 | 0·086 | 1·9 | 16·1 |

*Remarks.*—This coal is very similar to the other lignites. It is not at all friable when fresh, and the refuse seems to be somewhat weaker than the coal itself.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | This lignite was not washed. | | | | | |
| 20. | Washed coal.... | | | | | | |
| 21. | Refuse—coarse.. | | | | | | |
| 22. | Hutch product.. | | | | | | |
| 23. | Jig slimes. ..... | | | | | | |
| 24. | Table slimes.... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal........................ | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. | Washed coal........................ | " " | .... | " " | .... | " " | .... |
| 27. | Refuse............................ | " " | .... | " " | .... | " " | .... |
| 28. | Other products..................... | " " | .... | " " | .... | " " | .... |
| 29. | Loss............................. | " " | .... | " " | .... | " " | .... |
| 30. | Loss in % .... | | | | | | |

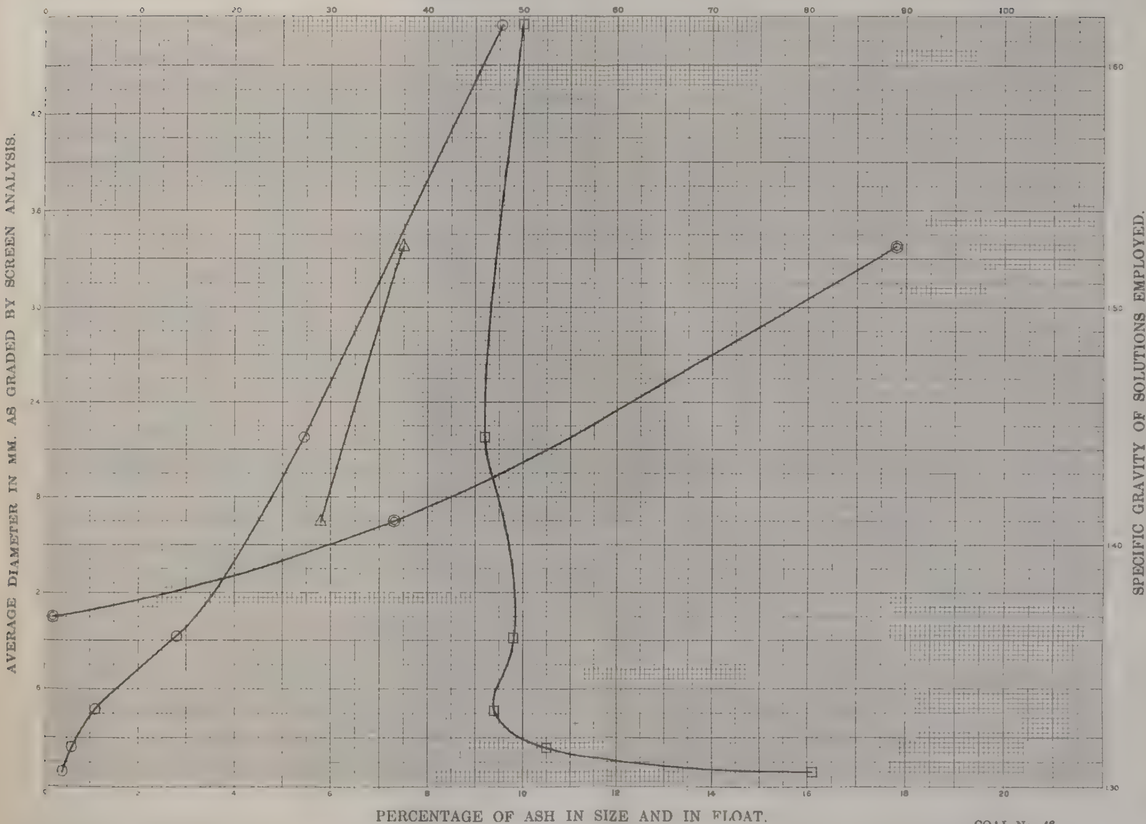
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | | |
|---|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. . % | .... | Ratio to standard | .... |
| 32. | Reduction in ash.............................% | .... | " " | .... |
| 33. | " " sulphur............................% | .... | " " | .... |
| 34. | Increase in calorific value—calorimeter .........% | .... | | |
| 35. | Increase in evaporation under boiler............% | .... | | |
| 36. | Decrease in clinker under boiler................% | .... | | |
| 37. | Fuel ratio of original coal........................ | .... | | |
| 38. | " " washed " ...................... | .... | | |
| 39. | Calorific value of original coal.................... | .... | | |
| 40. | " " washed " ................. | .... | | |

*Remarks on Tables C, D, and E.*—None of the lignites were washed.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 46
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

## COAL.—No. 42.

*Locality.*—Edmonton, Alberta.

*Colliery.*—Parkdale Coal Co., Edmonton.

*Sample.*—A sample of twenty-five sacks was taken directly from the bar screen at the bank head, on July 15, 1908, and an additional sample of seventy-five sacks was taken at the same place on August 1. The coal is drawn from three entries driven to the southeast, northeast, and northwest from the bottom of the shaft, which is 196 feet deep.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·530 | 95·3 | 10·0 | 4·7 | 53·2 |
| 2. | 1·430 | 84·1 | 9·6 | 15·9 | 26·8 |
| 3. | 1·375 | 0·0 | .... | 100·0 | 12·0 |
| 4. | 1·325 | 0·0 | .... | 100·0 | 11·9 |

The following results are obtained from the above data, and the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | .... | % ash | .... |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 96·0 | " " | 10·2 |
| 7. | Useful coal—sum of (5) and (6) | " " | 96·0 | " " | 10·2 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 4·0 | " " | 55·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 10·9 |
| 10. | " " " " " " | | | % sulphur | 0·4 |
| 11. | " " " " " " | | | Fuel Ratio | 1·36 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 1·36 |

*Remarks.*—This coal is a typical western lignite and is quite unsuitable for washing. It consists of a fairly homogeneous high ash coal, with a small amount of refuse matter, itself very low in ash.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 56·0 | 9·0 |
| 14. | 3·16 | 1·20 | 2·18 | 26·3 | 8·4 |
| 15. | 1·20 | 0·64 | 0·92 | 10·1 | 8·7 |
| 16. | 0·64 | 0·30 | 0·47 | 4·3 | 9·1 |
| 17. | 0·30 | 0·173 | 0·24 | 2·3 | 10·6 |
| 18. | 0·173 | 0·000 | 0·086 | 1·0 | 11·4 |

*Remarks.*—The coal is not at all friable when fresh, and makes very little dust. What refuse there is in it is weaker than the coal.

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal ... | This lignite was not washed. | | | | | |
| 20. Washed coal.... | | | | | | |
| 21. Refuse—coarse.. | | | | | | |
| 22. Hutch product.. | | | | | | |
| 23. Jig slimes. ..... | | | | | | |
| 24. Table slimes.... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. Original coal ........................ | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. Washed coal......................... | " " | .... | " " | .... | " " | .... |
| 27. Refuse.............................. | " " | .... | " " | .... | " " | .... |
| 28. Other products...................... | " " | .... | " " | .... | " " | .... |
| 29. Loss................................ | " " | .... | " " | .... | " " | .... |
| 30. Loss in % | | | | | | |

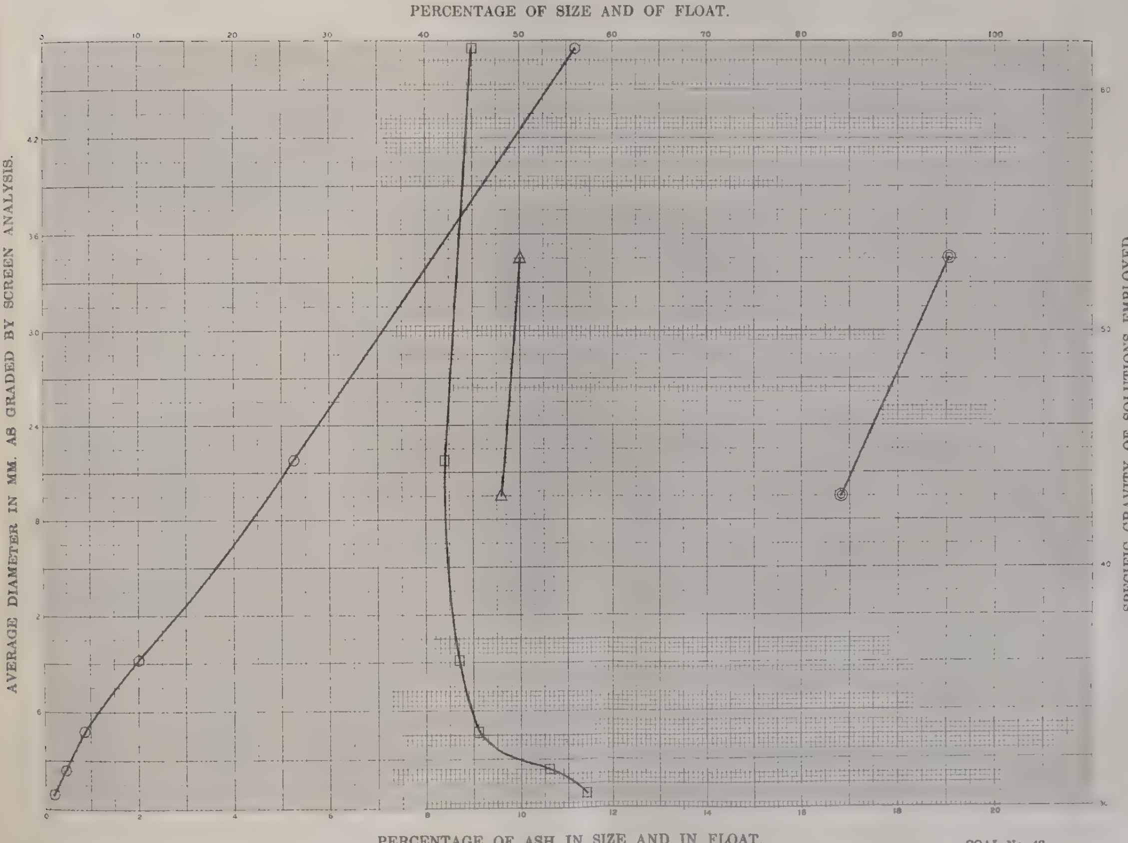
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone.... | % | .... | Ratio to standard | .... |
| 32. Reduction in ash................................ | % | .... | " " | .... |
| 33. " " sulphur..................................... | % | .... | " " | .... |
| 34. Increase in calorific value—calorimeter ......... | % | .... | | |
| 35. Increase in evaporation under boiler............ | % | .... | | |
| 36. Decrease in clinker under boiler................ | % | .... | | |
| 37. Fuel ratio of original coal..................... | | .... | | |
| 38. " " washed " ................................... | | .... | | |
| 39. Calorific value of original coal................ | | .... | | |
| 40. " " washed " ................................... | | .... | | |

*Remarks on Tables C, D, and E.*—None of the lignites were washed.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 42
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

## COAL.—No. 45.

*Locality.*—Edmonton, Alberta.

*Colliery.*—Standard Coal Co., formerly City Coal Co.

*Sample.*—A sample of twenty-five sacks was taken from a pile which had been mined a few hours before. The coal, which had all been screened over bars with $1\frac{1}{2}''$ openings, had been drawn from workings from one to 300 yards northwest of the shaft. Sampled July 16, 1908.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·550 | 97·0 | 8·0 | 3·0 | 41·3 |
| 2. | 1·440 | 52·7 | 7·0 | 47·3 | 12·0 |
| 3. | 1·390 | 6·0 | 5·2 | 94·0 | 9·1 |
| 4. | 1·300 | 0·0 | .... | 100·0 | 9·0 |

The following results are obtained from the above data, and the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | .... | % ash | .... |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 97·0 | " " | 8·0 |
| 7. | Useful coal—sum of (5) and (6) | " " | 97·0 | " " | 8·0 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 3·0 | " " | 41·3 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 8·1 |
| 10. | " " " " " " | | | % sulphur | 0·4 |
| 11. | " " " " " " | | | Fuel Ratio | 1·19 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 1·30 |

*Remarks.*—This coal, like the other Alberta lignites, is not suitable for washing. Nearly all of the ash is innate, and the refuse is exceptionally small in amount.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 47·6 | 6·7 |
| 14. | 3·16 | 1·20 | 2·18 | 26·0 | 6·7 |
| 15. | 1·20 | 0·64 | 0·92 | 12·8 | 7·8 |
| 16. | 0·64 | 0·30 | 0·47 | 6·9 | 7·1 |
| 17. | 0·30 | 0·173 | 0·24 | 4·3 | 7·5 |
| 18. | 0·173 | 0·000 | 0·086 | 2·4 | 9·5 |

*Remarks.*—This coal is similar to No. 42, but somewhat weaker. The ash-bearing material, while small in amount, is weaker than the coal itself, and produces more dust.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | This lignite was not washed. | | | | | |
| 20. | Washed coal.... | | | | | | |
| 21. | Refuse—coarse.. | | | | | | |
| 22. | Hutch product.. | | | | | | |
| 23. | Jig slimes...... | | | | | | |
| 24. | Table slimes.... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal ........................ | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. | Washed coal........................ | " " | .... | " " | .... | " " | .... |
| 27. | Refuse............................. | " " | .... | " " | .... | " " | .... |
| 28. | Other products..................... | " " | .... | " " | .... | " " | .... |
| 29. | Loss............................... | " " | .... | " " | .... | " " | .... |
| 30. | Loss in % | | | | | | |

TABLE E.

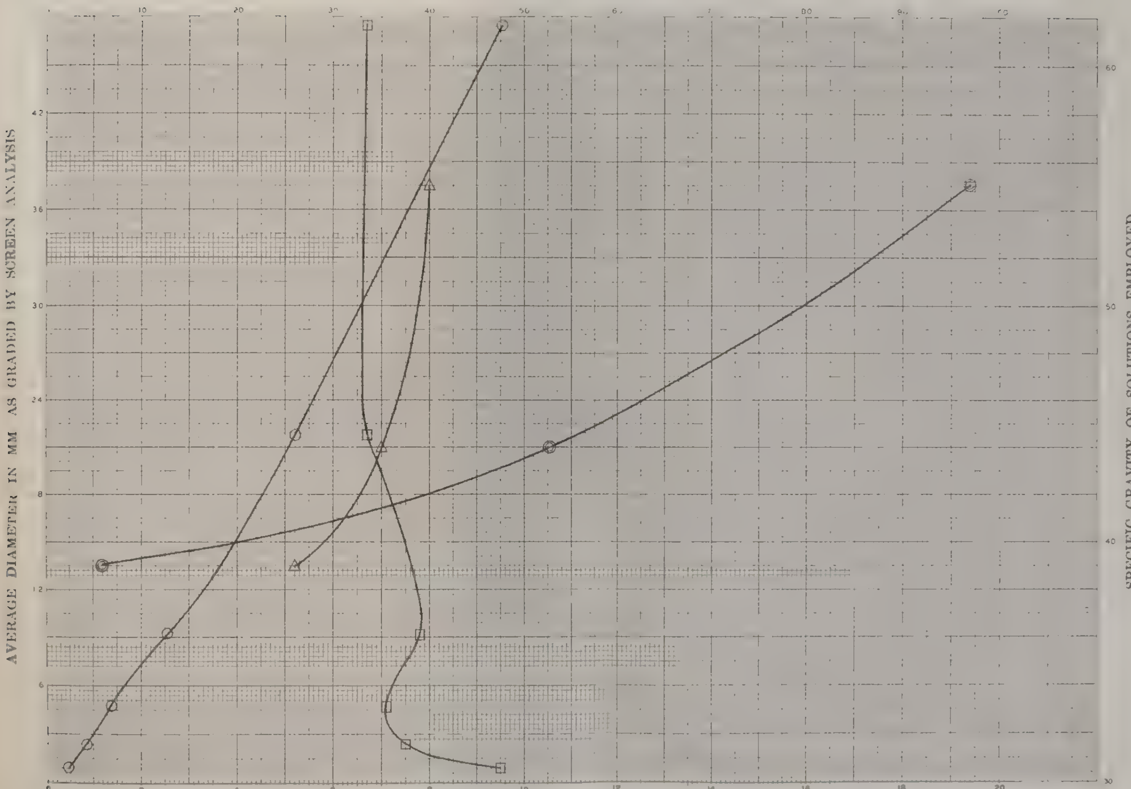
## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone....% | .... | Ratio to standard | .... |
| 32. | Reduction in ash............................% | .... | " " | .... |
| 33. | " " sulphur.........................% | .... | " " | .... |
| 34. | Increase in calorific value—calorimeter..........% | .... | | |
| 35. | Increase in evaporation under boiler............% | .... | | |
| 36. | Decrease in clinker under boiler................% | .... | | |
| 37. | Fuel ratio of original coal..................... | .... | | |
| 38. | " " washed " ..................... | .... | | |
| 39. | Calorific value of original coal.................. | .... | | |
| 40. | " " washed " ................. | .... | | |

*Remarks on Tables C, D, and E.*—None of the lignites were washed.

GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.

PERCENTAGE OF SIZE AND OF FLOAT.




PERCENTAGE OF ASH IN SIZE AND IN FLOAT.

COAL No. 45
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◉ " " " " " " " material floating at the several densities.

# BELLY RIVER FIELD, LETHBRIDGE, ALBERTA.

ERRATUM

On the curve diagrams accompanying the tabulated records of each of the coals tested, is the following legend:—

LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

The above legend is incorrect; in each case it should read thus:—

○ Curve showing the relative quantities of the several sizes.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " material floating at the several densities.
△ " " " " " ash in " " " " " "

## COAL.—No. 43.

*Locality.*—Taber, Alberta.

*Colliery.*—Canada West Coal Co.

*Sample.*—A sample of seventy-five sacks, representing the average coal from Levels No. 2 East and No. 2 West, at distances of about 800 feet in on the main entry and 1,200 feet out on the levels. The coal was screened on a $\frac{3}{4}''$ shaking screen before sacking. Sampled July 23, 1908.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·530 | 90·0 | 11·4 | 10·0 | 36·7 |
| 2. | 1·425 | 59·0 | 7·9 | 41·0 | 22·5 |
| 3. | 1·375 | 34·0 | 5·4 | 66·0 | 18·1 |
| 4. | 1·315 | 5·0 | ... | 95·0 | 14·8 |

The following results are obtained from the above data, and the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 34·0 | % ash | 5·4 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 60·0 | " " | 15·4 |
| 7. | Useful coal—sum of (5) and (6) | " " | 94·0 | " " | 11·8 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 6·0 | " " | 45·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 14·1 |
| 10. | " " " " " " | | | % sulphur | 1·4 |
| 11. | " " " " " " | | | Fuel Ratio | 1·39 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 1·41 |

*Remarks.*—This coal is lignitic in character, and cannot be properly judged by standards which are suitable for bituminous coals. There is little distinction between good coal and bone coal, and, as a matter of fact, the latter is, in this case, and that of the Galt coal, really a good fuel. The coal would not be sufficiently improved by washing to justify treatment.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 34·9 | 12·9 |
| 14. | 3·16 | 1·20 | 2·18 | 36·8 | 12·3 |
| 15. | 1·20 | 0·64 | 0·92 | 14·3 | 11·7 |
| 16. | 0·64 | 0·30 | 0·47 | 7·7 | 11·9 |
| 17. | 0·30 | 0·173 | 0·24 | 4·4 | 12·8 |
| 18. | 0·173 | 0·000 | 0·086 | 1·9 | 14·5 |

*Remarks.*—The coal is apparently not so strong as that from Lethbridge No. 44, but yet it is by no means weak or friable. The ash-forming materials do not seem to differ greatly from the coal in strength.

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal ... | This coal was not washed. | | | | | |
| 20. Washed coal.... | | | | | | |
| 21. Refuse—coarse.. | | | | | | |
| 22. Hutch product.. | | | | | | |
| 23. Jig slimes...... | | | | | | |
| 24. Table slimes.... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. Original coal........................ | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. Washed coal........................ | " " | .... | " " | .... | " " | .... |
| 27. Refuse............................ | " " | .... | " " | .... | " " | .... |
| 28. Other products...................... | " " | .... | " " | .... | " " | .... |
| 29. Loss.............................. | " " | .... | " " | .... | " " | .... |
| 30. Loss in % | | .... | | .... | | .... |

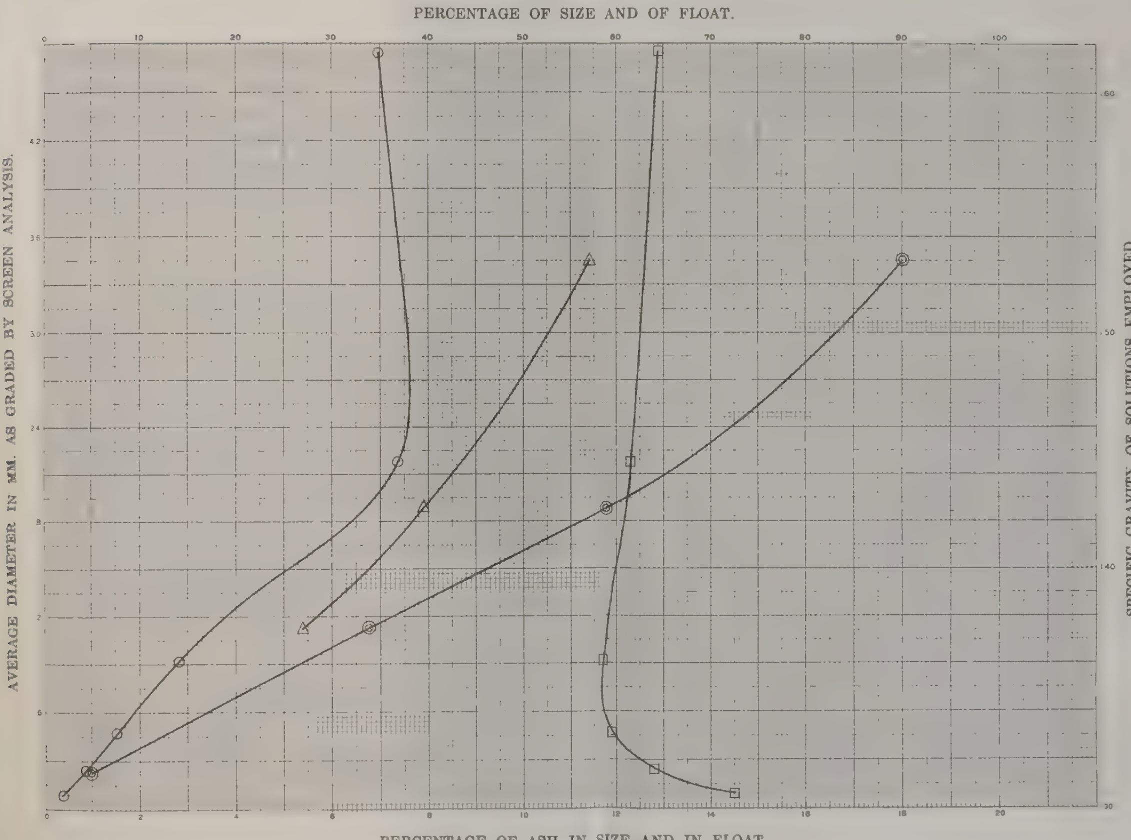
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone.. | % | .... | Ratio to standard | .... |
| 32. Reduction in ash.............................. | % | .... | " " | .... |
| 33. " " sulphur........................ | % | .... | " " | .... |
| 34. Increase in calorific value—calorimeter ......... | % | .... | | |
| 35. Increase in evaporation under boiler............ | % | .... | | |
| 36. Decrease in clinker under boiler................ | % | .... | | |
| 37. Fuel ratio of original coal........................ | | .... | | |
| 38. " " washed " ...................... | | .... | | |
| 39. Calorific value of original coal................... | | .... | | |
| 40. " " washed " ................. | | .... | | |

*Remarks on Tables C, D, and E.*—For reasons already explained this coal was not washed.

GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. 43
APPENDIX I, VOL. III

## COAL.—No. 44.

*Locality.*—Lethbridge, Alberta.

*Colliery.*—Galt colliery, Alberta Railway and Irrigation Co.

*Sample.*—Eight sacks were filled from each of five railway cars, and ten sacks from one car. The cars had just been loaded with coal which had been screened over $\frac{3}{4}''$, and had been hand picked. The sample represents the ordinary screened coal shipped by the Company. Sampled July 22, 1908.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·540 | 94·9 | 8·3 | 5·1 | 49·0 |
| 2. | 1·440 | 89·3 | 7·3 | 10·7 | 35·3 |
| 3. | 1·380 | 84·5 | 6·9 | 15·5 | 29·0 |
| 4. | 1·330 | 31·8 | 4·7 | 68·2 | 12·9 |

The following results are obtained from the above data, and from the chemists results.

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 83·5 | % ash | 6·8 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 12·2 | " " | 20·0 |
| 7. | Useful coal—sum of (5) and (6) | " " | 95·5 | " " | 8·4 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 4·5 | " " | 52·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 11·0 |
| 10. | " " " " " " | | | % sulphur | 0·8 |
| 11. | " " " " " " | | | Fuel Ratio | 1·37 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 1·36 |

*Remarks.*—The coal contains a large amount of innate ash, and a moderate amount of bone coal high in ash, but quite suitable for burning. There is little refuse, and it is low in ash. The coal would, therefore, be very little improved by washing.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 47·5 | 11·3 |
| 14. | 3·16 | 1·20 | 2·18 | 31·1 | 9·9 |
| 15. | 1·20 | 0·64 | 0·92 | 11·9 | 9·8 |
| 16. | 0·64 | 0·30 | 0·47 | 5·0 | 10·7 |
| 17. | 0·30 | 0·173 | 0·24 | 2·9 | 12·4 |
| 18. | 0·173 | 0·000 | 0·086 | 1·6 | 16·8 |

*Remarks.*—The coal is not at all friable, and stands shipment and crushing well, making very little dust. The coarse and fine sizes contain

more ash than the intermediate, indicating that probably there are two ash-bearing materials, one weaker and the other stronger than the coal itself.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | This coal was not washed. | | | | | |
| 20. | Washed coal.... | | | | | | |
| 21. | Refuse—coarse.. | | | | | | |
| 22. | Hutch product.. | | | | | | |
| 23. | Jig slimes. ..... | | | | | | |
| 24. | Table slimes.... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal ...................... | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. | Washed coal...................... | " " | .... | " " | .... | " " | .... |
| 27. | Refuse........................... | " " | .... | " " | .... | " " | .... |
| 28. | Other products.................... | " " | .... | " " | .... | " " | .... |
| 29. | Loss.............................. | " " | .... | " " | .... | " " | .... |
| 30. | Loss in % | | .... | | .... | | .... |

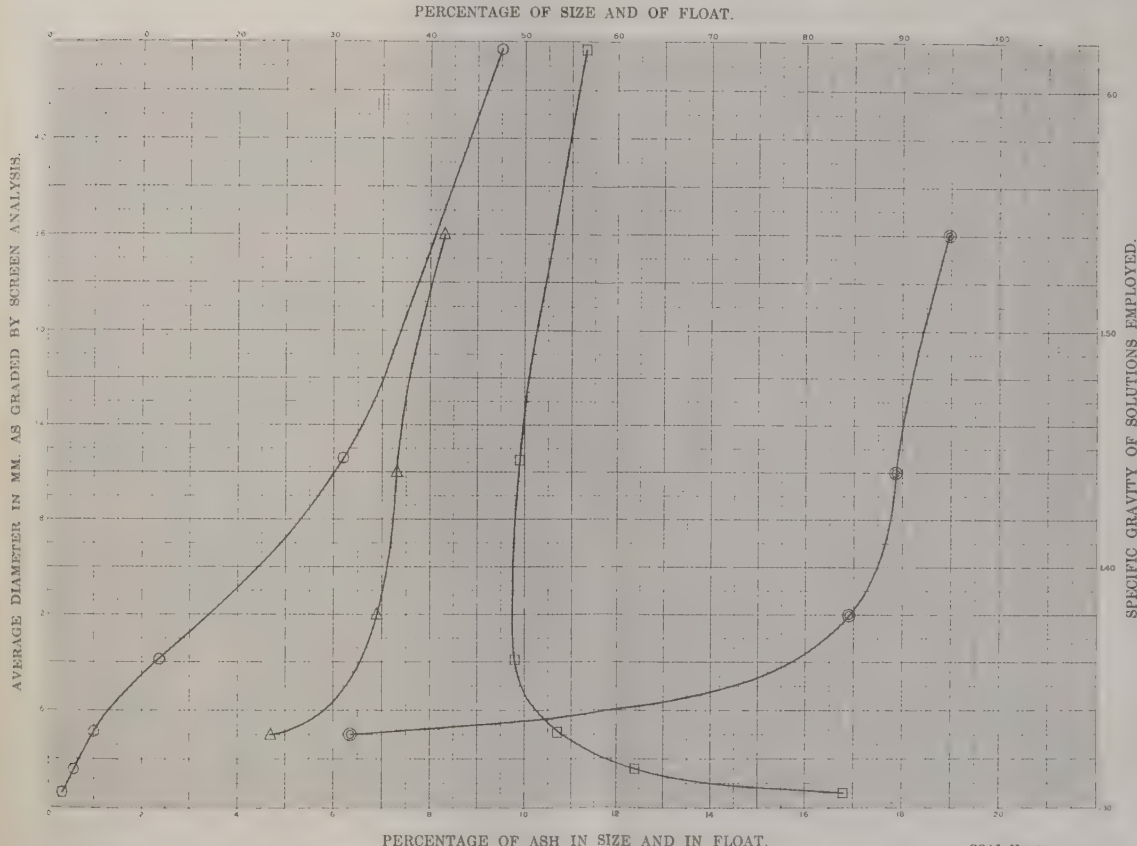
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | | |
|---|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. .. | % | .... | Ratio to standard | .... |
| 32. | Reduction in ash.............................. | % | .... | " " | .... |
| 33. | " " sulphur.............................. | % | .... | " " | .... |
| 34. | Increase in calorific value—calorimeter ......... | % | .... | | |
| 35. | Increase in evaporation under boiler............ | % | .... | | |
| 36. | Decrease in clinker under boiler................ | % | .... | | |
| 37. | Fuel ratio of original coal...................... | | .... | | |
| 38. | " " washed " ...................... | | .... | | |
| 39. | Calorific value of original coal.................. | | .... | | |
| 40. | " " washed " ................. | | .... | | |

*Remarks on Tables C, D, and E.*—This coal was not washed, for reasons already stated.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 44
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

## COAL.—No. 47.

*Locality.*—Lundbreck, Alberta.

*Colliery.*—Lun-Breckenridge.

*Sample.*—Twenty-two sacks were taken from a chute which had been left partly filled with coal in February, 1908. The mine was not in operation at the time of taking the sample, July 21, 1908, and, in fact, had not been operated for nearly six months. The sample was run of mine, and probably represents a much poorer grade of coal than would be produced under commercial conditions.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·540............. | 73·8 | 12·7 | 26·2 | 68·5 |
| 2. | 1·415............. | 49·4 | 8·6 | 50·6 | 51·7 |
| 3. | 1·370............. | 44·6 | 7·7 | 55·4 | 42·1 |
| 4. | 1·350............. | 12·7 | 3·9 | 87·3 | 31·3 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 ........................ | % yield | 45·5 | % ash | 7·8 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55..................... | " " | 31·0 | " " | 20·5 |
| 7. | Useful coal—sum of (5) and (6)....................... | " " | 76·5 | " " | 13·0 |
| 8. | Refuse, Sp. Gr. over 1·55 ........................... | " " | 23·5 | " " | 71·0 |
| 9. | Assay of original sample raw coal as sent to chemist.............. | | | " " | 29·7 |
| 10. | " " " " " " .............. | | | % sulphur | 1·2 |
| 11. | " " " " " " .............. | | | Fuel Ratio | 1·33 |
| 12. | Assay of mixed good and bone coal (5) and (6).................. | | | " " | 1·50 |

*Remarks.*—This coal is very high in innate ash. It also contains a large amount of bone coal, rather high in ash, and a considerable amount of refuse, very high in ash. The coal could be greatly improved by washing. It would, however, still carry about 15 per cent of ash unless the amount of bone discarded were very large.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 33·1 | 33·8 |
| 14. | 3·16 | 1·20 | 2·18 | 30·6 | 30·7 |
| 15. | 1·20 | 0·64 | 0·92 | 13·2 | 28·3 |
| 16. | 0·64 | 0·30 | 0·47 | 7·2 | 26·8 |
| 17. | 0·30 | 0·173 | 0·24 | 6·2 | 26·1 |
| 18. | 0·173 | 0·000 | 0·086 | 10·7 | 31·5 |

*Remarks.*—The sample was run of mine, and is, apparently, moderately friable. Possibly the considerable percentage of fine coal may be in part due to the age of the sample, which had remained in the chutes for nearly six months before it was drawn.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal . . . | This sample was not washed. | | | | | |
| 20. | Washed coal. . . . | | | | | | |
| 21. | Refuse—coarse. . | | | | | | |
| 22. | Hutch product. . | | | | | | |
| 23. | Jig slimes. . . . . . | | | | | | |
| 24. | Table slimes. . . . | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | |
|---|---|---|---|---|
| 25. | Original coal . . . . . . . . . . . . . . . . . . . . . . . | wt. in lbs. . . . . | % ash . . . . | % sulphur . . . . |
| 26. | Washed coal. . . . . . . . . . . . . . . . . . . . . . . . | " " . . . . | " " . . . . | " " . . . . |
| 27. | Refuse. . . . . . . . . . . . . . . . . . . . . . . . . . . . . | " " . . . . | " " . . . . | " " . . . . |
| 28. | Other products. . . . . . . . . . . . . . . . . . . . . . | " " . . . . | " " . . . . | " " . . . . |
| 29. | Loss. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | " " . . . . | " " . . . . | " " . . . . |
| 30. | Loss in % | | | |

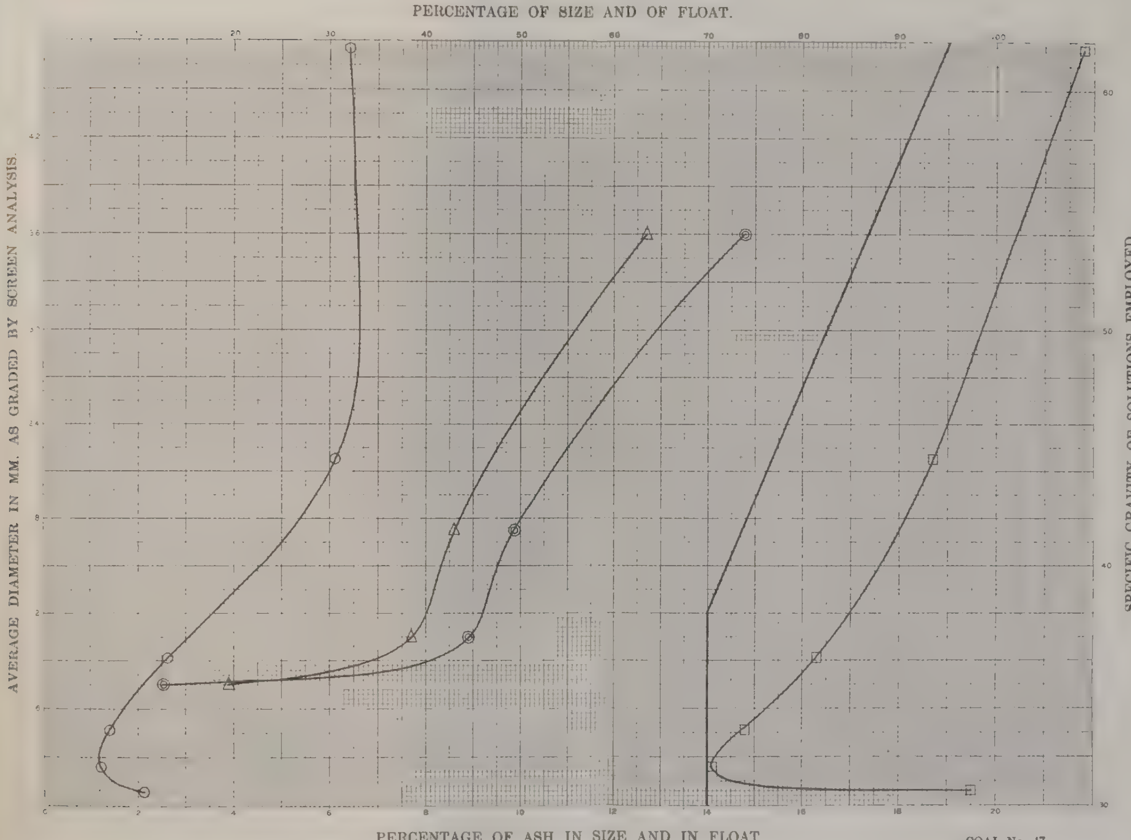
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | |
|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. . . . % | . . . . | Ratio to standard . . . . |
| 32. | Reduction in ash. . . . . . . . . . . . . . . . . . . . . . . . . . . % | . . . . | " " . . . . |
| 33. | " " sulphur. . . . . . . . . . . . . . . . . . . . . . . . . . % | . . . . | " " . . . . |
| 34. | Increase in calorific value—calorimeter . . . . . . . . . % | . . . . | |
| 35. | Increase in evaporation under boiler. . . . . . . . . . . . % | . . . . | |
| 36. | Decrease in clinker under boiler. . . . . . . . . . . . . . . . % | . . . . | |
| 37. | Fuel ratio of original coal. . . . . . . . . . . . . . . . . . . . . | . . . . | |
| 38. | " " washed " . . . . . . . . . . . . . . . . . . . . . | . . . . | |
| 39. | Calorific value of original coal. . . . . . . . . . . . . . . . . | . . . . | |
| 40. | " " washed " . . . . . . . . . . . . . . . . . | . . . . | |

*Remarks on Tables C, D, and E.*—This coal was not washed, owing to the small size of the sample, and the doubt as to whether it was really representative of what the property would offer in full operation. If the sample may be taken as representative, it would be possible to greatly improve the coal by washing, but a high grade product could not be produced in commercial treatment.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 47
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

# THE EASTERN CROWSNEST PASS

# OR FRANK-BLAIRMORE FIELD.

## ERRATUM

On the curve diagrams accompanying the tabulated records of each of the coals tested, is the following legend:—

LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

The above legend is incorrect; in each case it should read thus:—

○ Curve showing the relative quantities of the several sizes.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " material floating at the several densities.
△ " " " " " ash in " " " " " "

## COAL.—No. 48.

*Locality.*—Passburg, Alberta.

*Colliery.*—Leitch Collieries, Ltd., Leitch colliery.

*Sample.*—This sample of sixty-two sacks was from a new mine, just being opened, on the 7 ft. seam, the entry being in only 1400 feet and the coal coming from workings about 50 feet to the rise. The sample was run of mine, taken directly from the cars. Sampled July 18, 1908.

TABLE A.

**Specific Gravity Tests.**

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·530 | 75·1 | 8·2 | 24·9 | 45·0 |
| 2. | 1·410 | 59·0 | 6·9 | 41·0 | 33·6 |
| 3. | 1·380 | 55·6 | 5·6 | 44·4 | 32·0 |
| 4. | 1·310 | 31·1 | 4·2 | 68·9 | 24·0 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 54·6 | % ash | 5·5 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 24·4 | " " | 15·5 |
| 7. | Useful coal—sum of (5) and (6) | " " | 79·0 | " " | 8·4 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 21·0 | " " | 47·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 17·9 |
| 10. | " " " " " " | | | % sulphur | 0·6 |
| 11. | " " " " " " | | | Fuel Ratio | 2·04 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 2·18 |

*Remarks.*—The innate ash is high, and the amount of bone and refuse large, with fairly low ash. This coal is supposed to be from the same seam as No. 33, but it is somewhat better suited to washing, although with the high innate ash, and the low refuse ash, no very satisfactory results are possible.

TABLE B.

**Screen Analysis.**

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 28·1 | 18·6 |
| 14. | 3·16 | 1·20 | 2·18 | 22·3 | 19·3 |
| 15. | 1·20 | 0·64 | 0·92 | 17·4 | 18·8 |
| 16. | 0·64 | 0·30 | 0·47 | 10·5 | 16·3 |
| 17. | 0·30 | 0·173 | 0·24 | 9·8 | 15·3 |
| 18. | 0·173 | 0·000 | 0·086 | 11·8 | 15·8 |

*Remarks.*—This coal is very similar to the other samples taken from the neighbourhood, and scarcely needs further comment.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | .... | .... | .... | .... | .... | .... |
| 20. | Washed coal.... | .... | .... | .... | .... | .... | .... |
| 21. | Refuse—coarse.. | .... | .... | .... | .... | .... | .... |
| 22. | Hutch product.. | .... | .... | .... | .... | .... | .... |
| 23. | Jig slimes...... | .... | .... | .... | .... | .... | .... |
| 24. | Table slimes.... | .... | .... | .... | .... | .... | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal ........................ | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. | Washed coal........................ | " " | .... | " " | .... | " " | .... |
| 27. | Refuse........................... | " " | .... | " " | .... | " " | .... |
| 28. | Other products..................... | " " | .... | " " | .... | " " | .... |
| 29. | Loss.............................. | | .... | | .... | | .... |
| 30. | Loss in % | | | | | | |

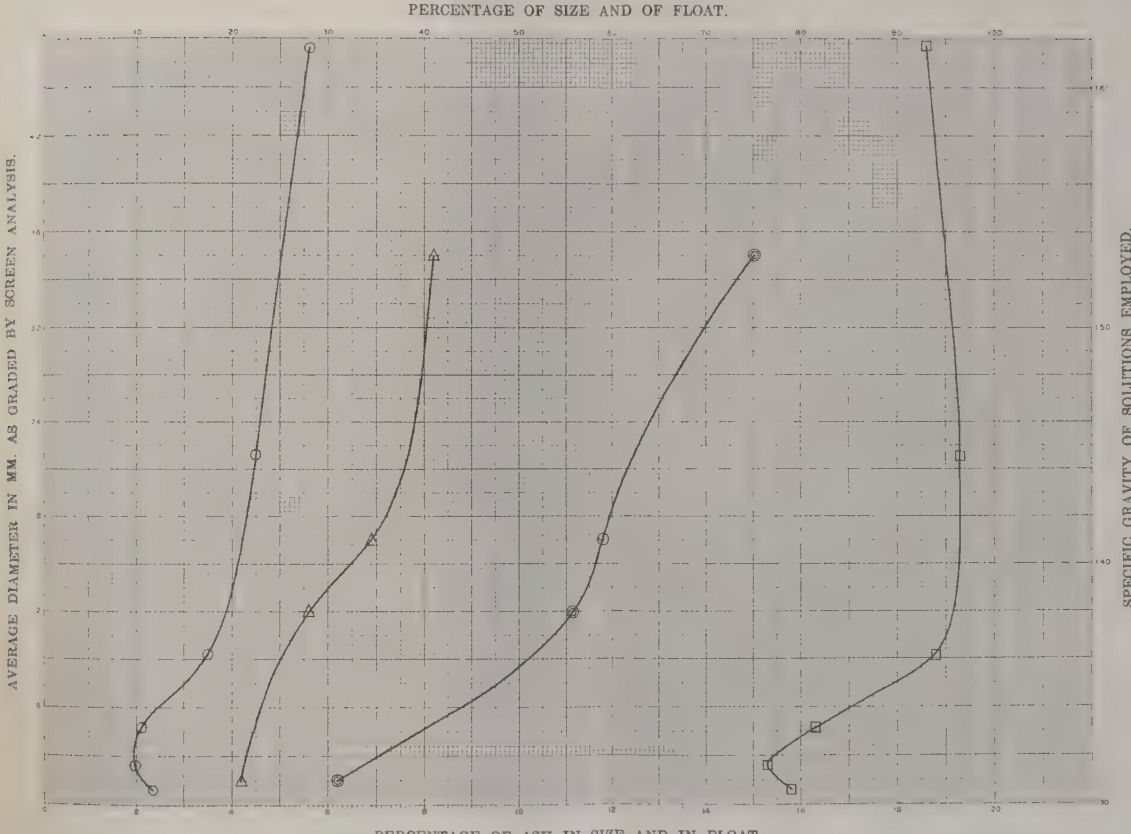
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone....% | .... | Ratio to standard | .... |
| 32. | Reduction in ash.............................% | .... | " " | .... |
| 33. | " " sulphur.........................% | .... | " " | .... |
| 34. | Increase in calorific value—calorimeter .........% | .... | | |
| 35. | Increase in evaporation under boiler............% | .... | | |
| 36. | Decrease in clinker under boiler................% | .... | | |
| 37. | Fuel ratio of original coal...................... | .... | | |
| 38. | " " washed " ................... | .... | | |
| 39. | Calorific value of original coal.................. | .... | | |
| 40. | " " washed " .................... | .... | | |

*Remarks on Tables C, D, and E.*—This coal was not washed, as the specific gravity trials did not promise very satisfactory results.

GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 48
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

## COAL.—No. 32.

*Locality.*—Hillcrest, near Frank, Alberta.

*Colliery.*—Hillcrest Coal and Coke Co., Hillcrest colliery.

*Sample.*—One hundred and forty-five sacks from the main workings of the mine, which are on the rise south of a tunnel extending about 3000 feet into the mountain. The sample was run of mine, taken directly from the bunkers. Sampled May 4, 1908.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·550 | 84·5 | 7·3 | 15·5 | 56·3 |
| 2. | 1·470 | 80·9 | 7·0 | 19·1 | 49·6 |
| 3. | 1·365 | 57·2 | 3·7 | 42·8 | 30·5 |
| 4. | 1·325 | 23·9 | 1·7 | 76·1 | 19·4 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 60·5 | % ash | 4·1 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 24·0 | " " | 15·6 |
| 7. | Useful coal—sum of (5) and (6) | " " | 84·5 | " " | 7·3 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 15·5 | " " | 56·3 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 15·3 |
| 10. | " " " " " " | | | % sulphur | 0·6 |
| 11. | " " " " " " | | | Fuel Ratio | 1·89 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 2·00 |

*Remarks.*—The coal contains a moderate proportion of innate ash, and carries a large amount of bone, rather low in ash, and a large amount of refuse, fairly high in ash. The coal could be considerably improved by washing, but is somewhat difficult to treat in a thoroughly satisfactory way, owing to the large amount of low ash bone.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 38·4 | 15·3 |
| 14. | 3·16 | 1·20 | 2·18 | 24·0 | 16·4 |
| 15. | 1·20 | 0·64 | 0·92 | 14·6 | 14·2 |
| 16. | 0·64 | 0·30 | 0·47 | 8·4 | 13·3 |
| 17. | 0·30 | 0·173 | 0·24 | 7·0 | 13·4 |
| 18. | 0·173 | 0·000 | 0·086 | 7·6 | 14·8 |

*Remarks.*—The amount of ash in the several sizes is unusually constant, although such variations as there are seem to be erratic. In view of the fact that the coal is run of mine, the proportion of fine sizes is not great, proving the coal to be only moderately friable.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal .............. | 2370 | 17·2 | 1734 | 14·8 | 1470 | 14·6 |
| 20. | Washed coal............... | 1944 | 11·1 | 1435 | 7·7 | 1177 | 8·6 |
| 21. | Refuse—coarse............. | 364 | 56·2 | 208 | 50·5 | 103 | 58·3 |
| 22. | Hutch product............. | 33 | 21·8 | 80 | 29·7 | .... | .... |
| 23. | Jig slimes. ................ | 23 | 10·9 | .... | .... | .... | .... |
| 24. | Table slimes............... | .... | .... | .... | .... | .... | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 25. | Original coal ........................ | wt. in lbs. | 5574 | % ash | 15·3 | % sulphur | 0·6 |
| 26. | Washed coal......................... | “ “ | 4556 | “ “ | 9·8 | “ “ | 0·5 |
| 27. | Refuse............................... | “ “ | 675 | “ “ | 55·2 | “ “ | .... |
| 28. | Other products...................... | “ “ | 204 | “ “ | .... | “ “ | .... |
| 29. | Loss.................................. | “ “ | 139 | “ “ | .... | “ “ | .... |
| 30. | Loss in % 2·5 | | | | | | |

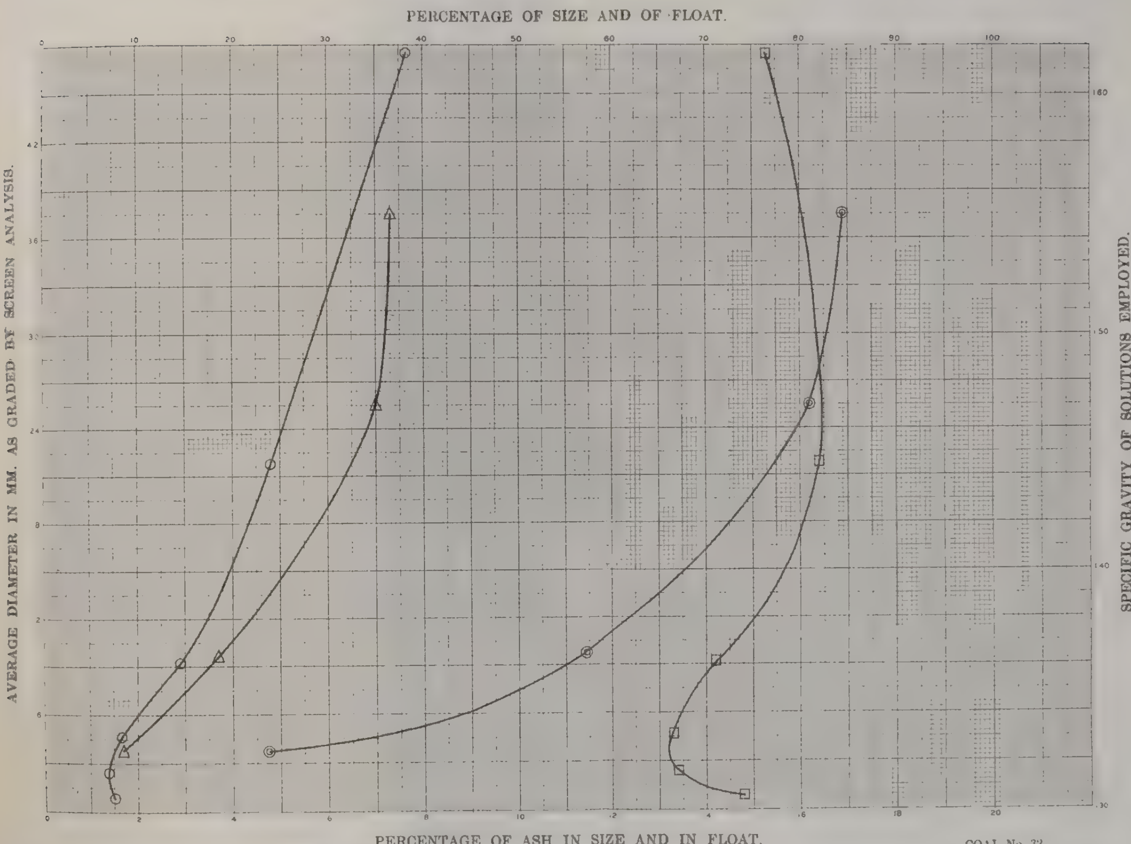
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. . % | 81·7 | Ratio to standard | 96·7 |
| 32. | Reduction in ash ................................ % | 35·9 | “ “ | 74·5 |
| 33. | “ “ sulphur. ................................ % | 16·7 | “ “ | .... |
| 34. | Increase in calorific value—calorimeter.......... % | 7·7 | | |
| 35. | Increase in evaporation under boiler............ % | 4·8 | | |
| 36. | Decrease in clinker under boiler................ % | 44·2 | | |
| 37. | Fuel ratio of original coal...................... | 1·89 | | |
| 38. | “ “ washed “ ...................... | 2·02 | | |
| 39. | Calorific value of original coal.................. | 6920 | | |
| 40. | “ “ washed “ ................. | 7450 | | |

*Remarks on Tables C, D, and E.*—This coal is a difficult one to wash, and the trial proved more satisfactory than might have been expected. Working on a large scale would give even better results, particularly as the medium size was not as well washed as it could have been on a second trial.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
▩ " " " " " " " material floating at the several densities.

COAL No. 32
APPENDIX I, VOL. III

## COAL.—No. 33.

*Locality.*—Frank, Alberta.

*Colliery.*—West Canadian collieries, Bellevue mine.

*Sample.*—One hundred and thirty-seven sacks from No. 1 seam. The sample was taken from the cars as they came direct from the mine workings, about 5000 feet in on the main entry, and 200 feet above it. The sample was run of mine, without screening or handpicking, beyond the occasional removal of conspicuous pieces of rock during the loading. Sampled May 5, 1908.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·540 | 86·9 | 9·2 | 13·2 | 43·5 |
| 2. | 1·440 | 73·0 | 7·2 | 27·0 | 32·8 |
| 3. | 1·365 | 47·0 | 5·1 | 53·0 | 22·4 |
| 4. | 1·315 | 21·0 | 2·8 | 79·0 | 18·2 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 51·7 | % ash | 5·4 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 35·8 | " " | 15·0 |
| 7. | Useful coal—sum of (5) and (6) | " " | 87·5 | " " | 9·5 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 12·5 | " " | 45·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 15·5 |
| 10. | " " " " " " | | | % sulphur | 0·8 |
| 11. | " " " " " " | | | Fuel Ratio | 2·06 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 2·09 |

*Remarks.*—The innate ash is high ; both the bone coal and the refuse are high in amount, but rather low in ash. The coal is, therefore, not very suitable for washing, although it can, of course, be considerably improved.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 35·1 | 19·3 |
| 14. | 3·16 | 1·20 | 2·18 | 19·3 | 16·4 |
| 15. | 1·20 | 0·64 | 0·92 | 13·5 | 13·8 |
| 16. | 0·64 | 0·30 | 0·47 | 9·7 | 13·5 |
| 17. | 0·30 | 0·173 | 0·24 | 9·8 | 13·0 |
| 18. | 0·173 | 0·000 | 0·086 | 12·6 | 14·6 |

*Remarks.*—The coal is moderately friable, the pure material being weaker than the bone and slate.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal | 2365 | 17·5 | 1770 | 15·3 | 1575 | 14·4 |
| 20. | Washed coal | 2034 | 13·0 | 1446 | 10·7 | 1246 | 13·7 |
| 21. | Refuse—coarse | 290 | 46·3 | 220 | 36·5 | 44 | 61·1 |
| 22. | Hutch product | 25 | 18·9 | 82 | 28·3 | .... | .... |
| 23. | Jig slimes | .... | .... | 43 | 16·1 | .... | .... |
| 24. | Table slimes | .... | .... | .... | .... | 158 | 12·1 |

TABLE D.

## Results of Washing (Totals).

| | | | | | | |
|---|---|---|---|---|---|---|
| 25. | Original coal | wt. in lbs. | 5710 | % ash 15·5 | % sulphur | 0·8 |
| 26. | Washed coal | " " | 4884 | " " 12·7 | " " | 0·5 |
| 27. | Refuse | " " | 554 | " " 42·0 | " " | .... |
| 28. | Other products | " " | 174 | " " .... | " " | .... |
| 29. | Loss | " " | 98 | " " .... | " " | .... |
| 30. | Loss in % 1·7· | | | | | |

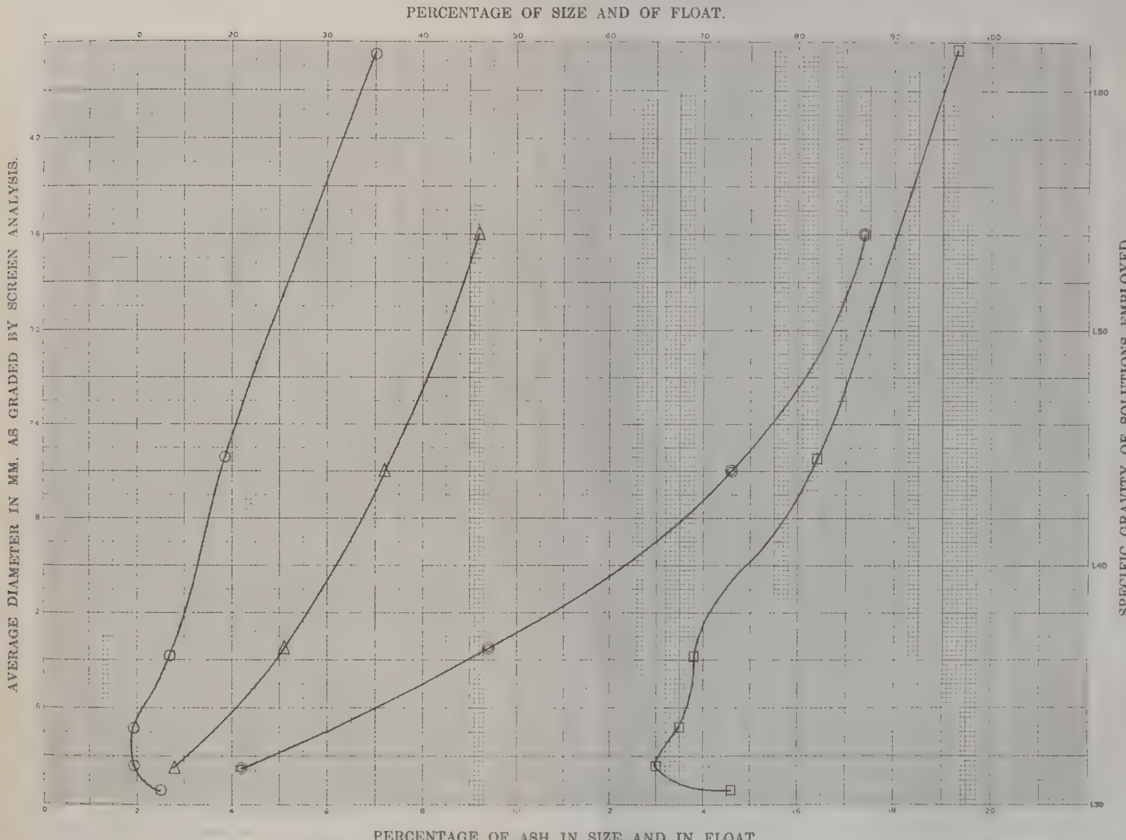
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. . % | 85·5 | Ratio to standard | 97·7 |
| 32. | Reduction in ash % | 18·1 | " " | 74·7 |
| 33. | " " sulphur % | 37·5 | " " | .... |
| 34. | Increase in calorific value—calorimeter % | 4·8 | | |
| 35. | Increase in evaporation under boiler % | 2·4 | | |
| 36. | Decrease in clinker under boiler % | 33·4 | | |
| 37. | Fuel ratio of original coal | 2·06 | | |
| 38. | " " washed " | 2·07 | | |
| 39. | Calorific value of original coal | 6880 | | |
| 40. | " " washed " | 7210 | | |

*Remarks on Tables C, D, and E.*—Owing to the results of the preliminary tests, it was not considered necessary to wash this coal on a large scale, although, of course, it can be considerably improved by such treatment.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes
◎ " " " " " " " material floating at the several densities.

COAL No. 33
Appendix I, Vol. III

## COAL.—No. 28.

*Locality.*—Lille, Alberta.

*Colliery.*—West Canadian Collieries, Ltd., Lille No. 1 seam.

*Sample.*—Sample of ten sacks of run of mine coal taken from workings about 5000 feet in on the main tunnel, and from 400 to 2000 feet to the rise. Sampled May 6, 1908.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·520............. | 83·6 | 7·0 | 16·4 | 61·8 |
| 2. | 1·430............. | 73·1 | 5·5 | 26·9 | 45·0 |
| 3. | 1·360............. | 58·4 | 4·0 | 41·6 | 33·7 |
| 4. | 1·330............. | 45·4 | 2·8 | 54·6 | 26·4 |

The following results are obtained from the above data, and from the chemist's results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375.......................... | % yield | 62·5 | % ash | 4·4 |
| 6. | Bone coal, Sp. Gr., 1·375 to 1·55....................... | " " | 23·0 | " " | 15·1 |
| 7. | Useful coal—sum of (5) and (6).......................... | " " | 85·5 | " " | 7·3 |
| 8. | Refuse, Sp. Gr. over 1·55............................... | " " | 14·5 | " " | 66·0 |
| 9. | Assay of original sample raw coal as sent to chemist.............. | | | " " | 16·4 |
| 10. | " " " " " " .............. | | | % sulphur | 0·5 |
| 11. | " " " " " " .............. | | | Fuel Ratio | 2·34 |
| 12. | Assay of mixed good and bone coal (5) and (6).................... | | | " " | 2·38 |

*Remarks.*—This coal has a medium quantity of innate ash, a large amount of bone, low in ash, and a large amount of refuse fairly high in ash. A considerable reduction in ash can be effected by washing, but the results would not be so good as if the percentage of bone were lower. The sample was not washed, as it was too small in amount, but the colliery has a washery which works on screenings and makes a product which is sufficiently free from ash to be coked with success.

Attention should be called to the fact that the refuse from washing this coal is quite combustible, although it carries over 60 per cent of ash. In practice it is used regularly at the washery for steam purposes.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 40·2 | 18·1 |
| 14. | 3·16 | 1·20 | 2·18 | 24·0 | 16·4 |
| 15. | 1·20 | 0·64 | 0·92 | 14·7 | 15·4 |
| 16. | 0·64 | 0·30 | 0·47 | 8·0 | 14·1 |
| 17. | 0·30 | 0·173 | 0·24 | 6·5 | 12·8 |
| 18. | 0·173 | 0·000 | 0·086 | 6·6 | 12·6 |

*Remarks.*—The sample is run of mine, and the amount of fine material is not high in the circumstances. The coal is of medium strength only, and much more friable than the ash-bearing material.

TABLE C.

## Results of Washing (Details of Sizes.)

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal .... | This coal was not washed. | | | | | |
| 20. | Washed coal.... | | | | | | |
| 21. | Refuse—coarse.. | | | | | | |
| 22. | Hutch product.. | | | | | | |
| 23. | Jig slimes. ..... | | | | | | |
| 24. | Table slimes.... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal........................ | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. | Washed coal........................ | " " | .... | " " | .... | " " | .... |
| 27. | Refuse............................ | " " | .... | " " | .... | " " | .... |
| 28. | Other products...................... | " " | .... | " " | .... | " " | .... |
| 29. | Loss.............................. | " " | .... | " " | .... | " " | .... |
| 30. | Loss in % .... | | | | | | |

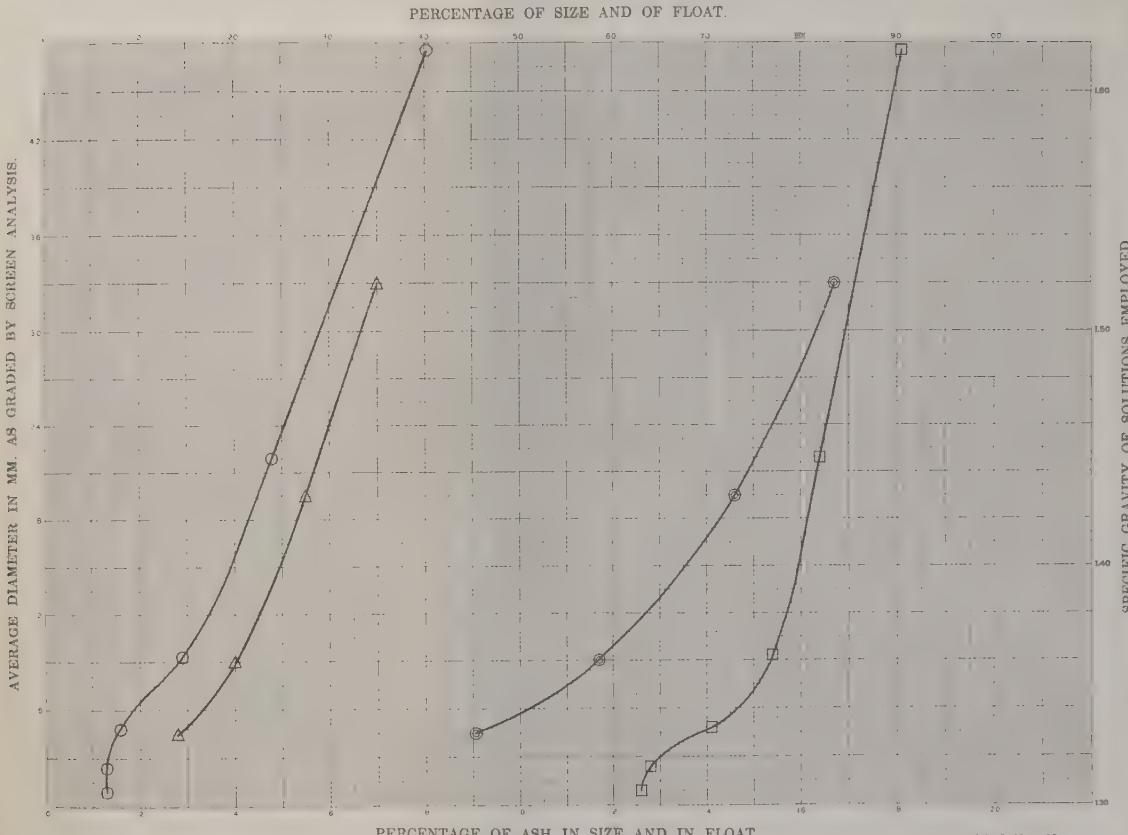
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | | |
|---|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone....% | .... | Ratio to standard | .... |
| 32. | Reduction in ash...........................% | .... | " " | .... |
| 33. | " " sulphur.......................% | .... | " " | .... |
| 34. | Increase in calorific value—calorimeter..........% | | | |
| 35. | Increase in evaporation under boiler............% | .... | | |
| 36. | Decrease in clinker under boiler................% | .... | | |
| 37. | Fuel ratio of original coal...................... | .... | | |
| 38. | " " washed " ...................... | .... | | |
| 39. | Calorific value of original coal.................. | .... | | |
| 40. | " " washed " ................ | .... | | |

*Remarks on Tables C, D, and E.*—Owing to the small size of this sample, washing was not attempted. The colliery operates a washery for screenings, which are used for the manufacture of coke.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 28
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

## COAL.—No. 34.

*Locality.*—Coleman, Alberta.

*Colliery.*—International Coal and Coke Co., Denison colliery, No. 2 seam.

*Sample.*—One hundred and twenty-eight sacks from No. 2 seam. The coal chosen was run of mine, shovelled from cars from chutes distant between 4200 and 6600 feet from the mouth of the mine entry. Sampled May 10, 1908.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·540............. | 75·7 | 8·5 | 24·3 | 54·7 |
| 2. | 1·420............. | 67·2 | 7·9 | 32·8 | 43·3 |
| 3. | 1·370............. | 46·6 | 3·9 | 53·4 | 31·1 |
| 4. | 1·320............. | 23·5 | 2·0 | 76·5 | 24·5 |

The following results are obtained from the above data, and from the chemists results.:—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375........................ | % yield | 48·5 | % ash | 4·4 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55..................... | " " | 27·5 | " " | 17·7 |
| 7. | Useful coal—sum of (5) and (6)...................... | " " | 76·0 | " " | 8·5 |
| 8. | Refuse, Sp. Gr. over 1·55 .......................... | " " | 24·0 | " " | 55·5 |
| 9. | Assay of original sample raw coal as sent to chemist.............. | | | " " | 19·8* |
| 10. | " " " " " " ............... | | | % sulphur | 0·4 |
| 11. | " " " " " " ............... | | | Fuel Ratio | 2·22 |
| 12. | Assay of mixed good and bone coal (5) and (6).................... | | | " " | 2·35 |

* It may be noted that several other samples from this seam, taken earlier and later for other purposes, all ran a little lower in ash than this main sample. It is, therefore, probable that, the above-named sample included some unusually low grade material. The variation would not, however, amount to more than say 2 per cent.

*Remarks.*—The coal contains a medium proportion of innate ash, and large amounts both of bone and refuse, which contain moderate percentages of ash. It can be considerably improved by washing, although it can never produce a very high grade product, owing to the considerable amount of medium bone, which carries a good deal of ash, and yet is too valuable to be thrown away.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 12·6 | 18·6 |
| 14. | 3·16 | 1·20 | 2·18 | 35·6 | 19·2 |
| 15. | 1·20 | 0·64 | 0·92 | 20·7 | 18·2 |
| 16. | 0·64 | 0·30 | 0·47 | 11·3 | 16·2 |
| 17. | 0·30 | 0·173 | 0·24 | 9·4 | 16·0 |
| 18. | 0·173 | 0·000 | 0·086 | 10·4 | 16·9 |

*Remarks.*—This coal is quite friable, although not as markedly so as that from the Coal Creek district. It might be noted that the two milli-

metre size contains the largest amount of ash, both coarser and finer materials being somewhat cleaner. This same fact has been noticed in several other coals in the district.

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal | 2490 | 22·4 | 2522 | 19·0 | 1246 | 16·8 |
| 20. Washed coal | 1773 | 13·7 | 1692 | 10·9 | 906 | 11·1 |
| 21. Refuse—coarse | 581 | 50·0 | 704 | 44·5 | 76 | 66·8 |
| 22. Hutch product | 82 | .... | 46 | 12·2 | .... | .... |
| 23. Jig slimes | .... | .... | 62 | 18·1 | .... | .... |
| 24. Table slimes | .... | .... | .... | .... | 197 | 13·2 |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. Original coal | wt. in lbs. | 6258 | % ash | 19·8 | % sulphur | 0·4 |
| 26. Washed coal | " " | 4568 | " " | 11·6 | " " | 0·4 |
| 27. Refuse | " " | 1361 | " " | 47·6 | " " | .... |
| 28. Other products | " " | 258 | " " | .... | " " | .... |
| 29. Loss | " " | 71 | " " | .... | " " | .... |

30. Loss in % 1·1.

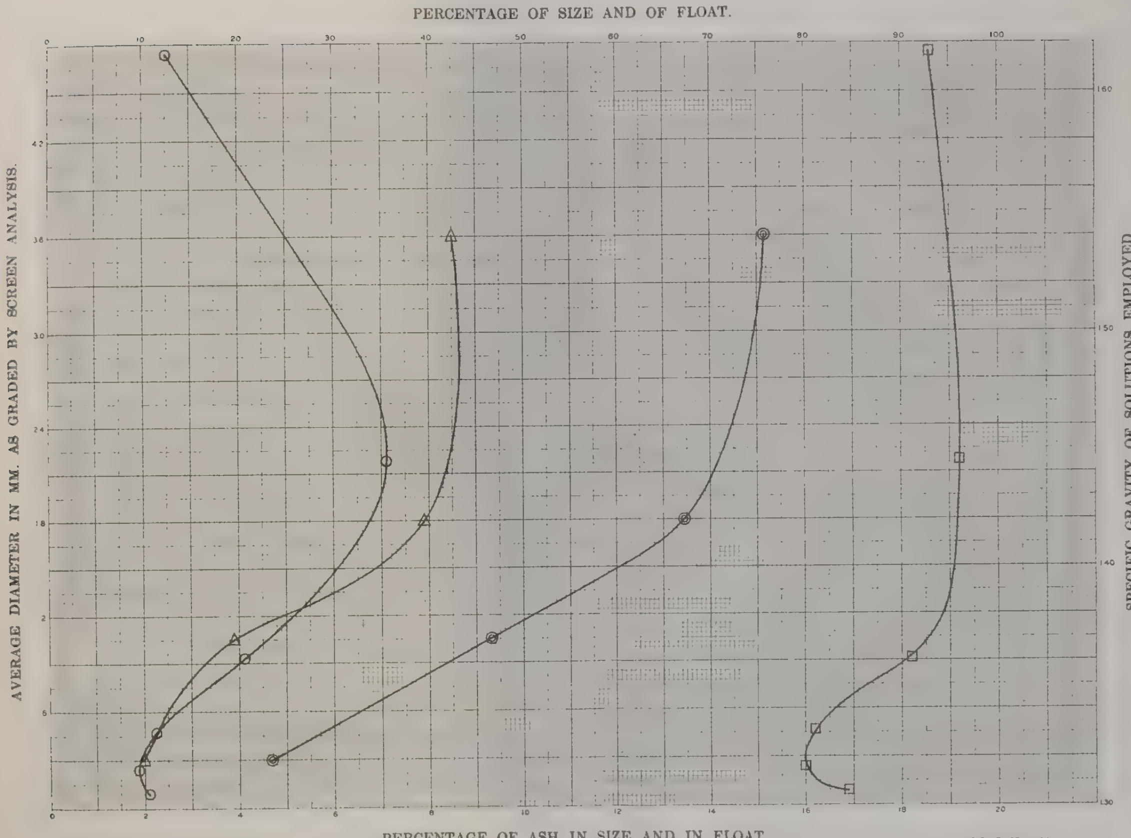
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone | % | 73·2 | Ratio to standard | 96·3 |
| 32. Reduction in ash | % | 41·4 | " " | 73·3 |
| 33. " " sulphur | % | .... | " " | .... |
| 34. Increase in calorific value—calorimeter | % | 12·4 | | |
| 35. Increase in evaporation under boiler | % | 9·3 | | |
| 36. Decrease in clinker under boiler | % | 57·4 | | |
| 37. Fuel ratio of original coal | | 2·22 | | |
| 38. " " washed " | | 2·35 | | |
| 39. Calorific value of original coal | | 6510 | | |
| 40. " " washed " | | 7320 | | |

*Remarks on Tables C, D, and E.*—The result of this trial was fairly satisfactory, although a better reduction of ash could easily be made in a commercial operation.

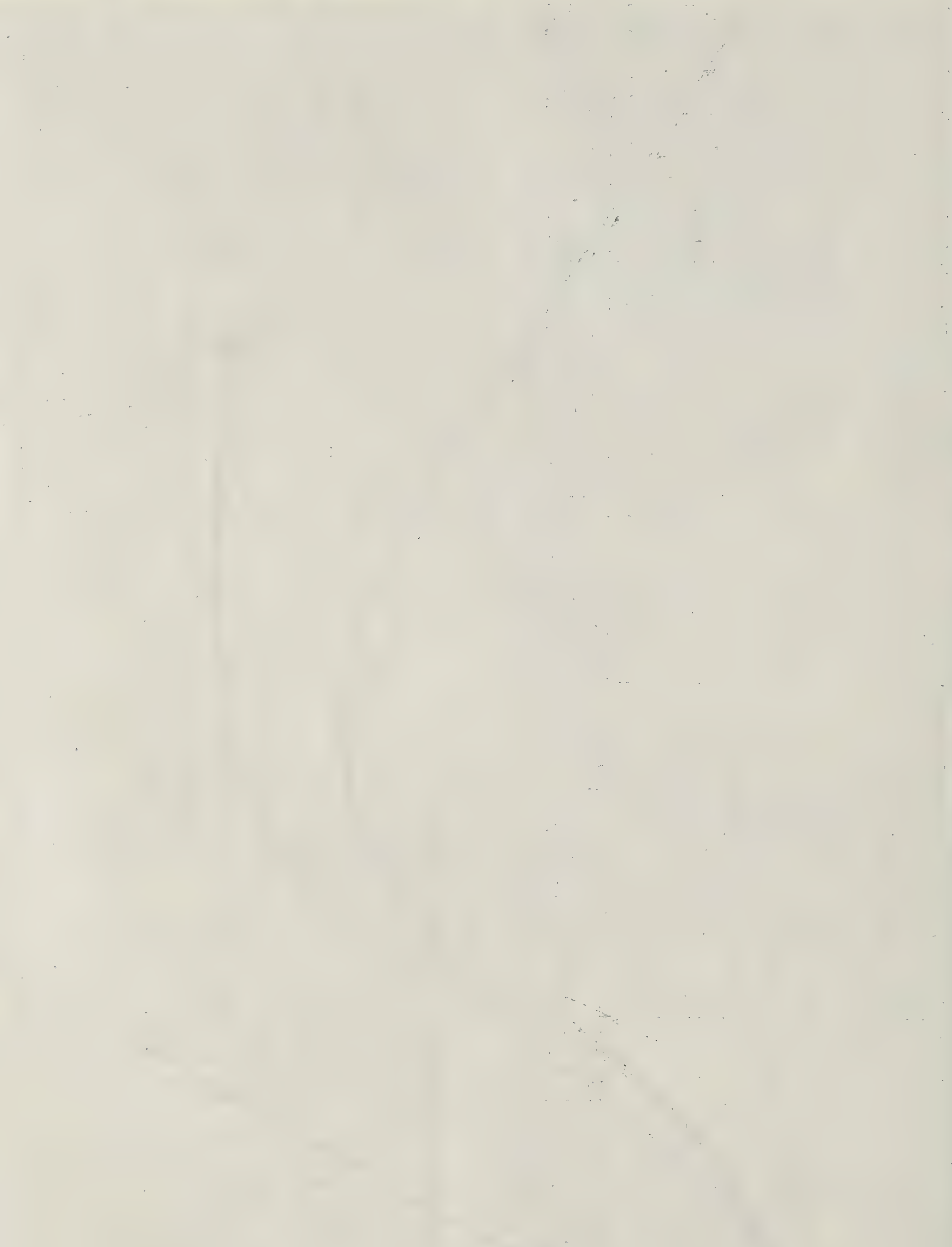
GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 34
Appendix I, Vol. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.



## COAL.—No. 34 SP.

*Locality.*—Coleman, Alberta.

*Colliery.*—International Coal and Coke Co., Denison colliery, No. 4 seam.

*Sample.*—Sample of twelve sacks from No. 4 seam, taken from one car each, from chutes at 790, 840, 1140, 3,000, and 5,700 feet from the entrance, respectively. The sample is run of mine, roughly hand picked. Sampled May 10, 1908.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·525 | 84·2 | 9·5 | 15·8 | 47·5 |
| 2. | 1·420 | 60·1 | 6·0 | 39·9 | 31·2 |
| 3. | 1·370 | 46·6 | 5·2 | 53·4 | 25·9 |
| 4. | 1·320 | 26·2 | 3·3 | 73·8 | 20·6 |

The following results are obtained from the above data, and from the chemist's results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 48·0 | % ash | 5·3 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 41·5 | " " | 16·3 |
| 7. | Useful coal—sum of (5) and (6) | " " | 89·5 | " " | 10·2 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 10·5 | " " | 51·9 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 16·2 |
| 10. | " " " " " " | | | % sulphur | 0·6 |
| 11. | " " " " " " | | | Fuel Ratio | 2·52 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 2·64 |

*Remarks.*—This coal is high in innate ash, and contains very large amounts of bone coal, and a large amount of refuse, each fairly low in ash. The coal is not very suitable for ash reduction by washing, on account of the character of its bone.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 17·4 | 14·4 |
| 14. | 3·16 | 1·20 | 2·18 | 22·1 | 17·4 |
| 15. | 1·20 | 0·64 | 0·92 | 18·3 | 15·7 |
| 16. | 0·64 | 0·30 | 0·47 | 13·5 | 14·8 |
| 17. | 0·30 | 0·173 | 0·24 | 13·0 | 14·9 |
| 18. | 0·173 | 0·000 | 0·086 | 15·7 | 15·8 |

*Remarks.*—The coal is quite friable, and shows the peculiarity mentioned for coal 34 and others, viz., that the proportion of two millimetre stuff is exceptionally large and carries the highest percentage of ash.

TABLE C.

## Results of Washing (Details of Sizes.)

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | This coal was not washed. | | | | | |
| 20. | Washed coal.... | | | | | | |
| 21. | Refuse—coarse.. | | | | | | |
| 22. | Hutch product.. | | | | | | |
| 23. | Jig slimes...... | | | | | | |
| 24. | Table slimes.... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal ........................ | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. | Washed coal........................ | " " | .... | " " | .... | " " | .... |
| 27. | Refuse............................ | " " | .... | " " | .... | " " | .... |
| 28. | Other products..................... | " " | .... | " " | .... | " " | .... |
| 29. | Loss............................... | " " | .... | " " | .... | " " | .... |
| 30. | Loss in %. | | | | | | |

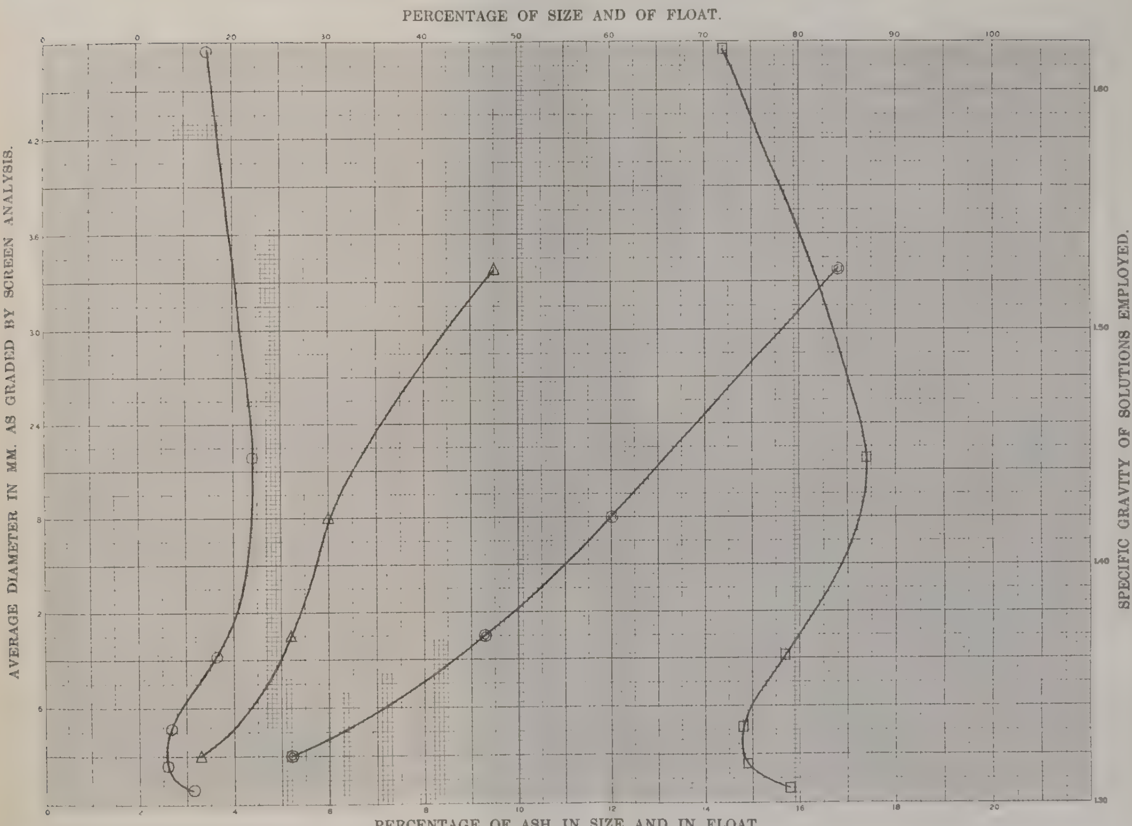
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | | |
|---|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. .. | % | .... | Ratio to standard | .... |
| 32. | Reduction in ash............................ | % | .... | " " | .... |
| 33. | " " sulphur........................ | % | .... | " " | .... |
| 34. | Increase in calorific value—calorimeter ......... | % | .... | | |
| 35. | Increase in evaporation under boiler............ | % | .... | | |
| 36. | Decrease in clinker under boiler................ | % | .... | | |
| 37. | Fuel ratio of original coal...................... | | .... | | |
| 38. | " " washed " ...................... | | .... | | |
| 39. | Calorific value of original coal.................. | | .... | | |
| 40. | " " washed " ................. | | .... | | |

*Remarks on Tables C, D, and E.*—Owing to the small quantity of this sample, and also to the results of the specific gravity tests, it was considered unnecessary to make any washing trial.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. 34 S.P
APPENDIX I, VOL. III

# THE WESTERN CROWSNEST PASS,

# OR ELK RIVER-FERNIE FIELD.

## ERRATUM

On the curve diagrams accompanying the tabulated records of each of the coals tested, is the following legend:—

### LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

The above legend is incorrect; in each case it should read thus:—

○ Curve showing the relative quantities of the several sizes.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " material floating at the several densities.
△ " " " " ash in " " " " " "

## COAL.—No. 31.

*Locality.*—Michel, B.C.

*Colliery.*—Crowsnest Pass Coal Co., Michel colliery No. 3.

*Sample.*—One hundred and fifty bags taken from cars as they came from the mine, which was being reopened. The coal was screened over bars set 2″ apart, and this represents less than one-third of the run of mine, over two-thirds being so fine as to run through the bars. Sampled April 30, 1908.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·515 | 88·1 | 6·9 | 11·9 | 54·8 |
| 2. | 1·425 | 85·0 | 5·8 | 15·0 | 51·2 |
| 3. | 1·380 | 78·1 | 3·4 | 21·9 | 43·5 |
| 4. | 1·330 | 63·4 | 2·8 | 36·5 | 31·5 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 77·4 | % ash | 3·3 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 10·6 | " " | 32·9 |
| 7. | Useful coal—sum of (5) and (6) | " " | 88·0 | " " | 6·8 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 12·0 | " " | 57·3 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 12·5 |
| 10. | " " " " " " | | | % sulphur | 0·5 |
| 11. | " " " " " " | | | Fuel Ratio | 2·53 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 2·66 |

*Remarks.*—The innate ash is low ; the bone coal is fairly high, and carries a large amount of ash, while the refuse is large in amount, with medium ash. The coal can, therefore, be considerably improved by washing.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 41·1 | 19·1 |
| 14. | 3·16 | 1·20 | 2·18 | 20·1 | 13·7 |
| 15. | 1·20 | 0·64 | 0·92 | 14·1 | 11·7 |
| 16. | 0·64 | 0·30 | 0·47 | 8·9 | 8·3 |
| 17. | 0·30 | 0·173 | 0·24 | 7·9 | 7·5 |
| 18. | 0·173 | 0·000 | 0·086 | 7·9 | 7·9 |

*Remarks.*—This coal is similar to the others from the immediate neighbourhood, although its average ash is higher. The coal, itself, is very

friable, while the ash-bearing material is comparatively strong. It should be noted that this sample, and the others from the same district, are of lump coal from which all the slack has been removed by screening.

TABLE C.

### Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal | 2441 | 17·4 | 1609 | 9·8 | 1955 | 9·0 |
| 20. | Washed coal | 1900 | 8·4 | 1370 | 5·6 | 1651 | 4·6 |
| 21. | Refuse—coarse | 434 | 51·3 | 144 | 47·3 | 74 | 54·8 |
| 22. | Hutch product | 78 | 20·0 | 81 | 23·6 | .... | .... |
| 23. | Jig slimes | .... | .... | 51 | 11·2 | .... | .... |
| 24. | Table slimes | .... | .... | .... | .... | .... | .... |

TABLE D.

### Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal | wt. in lbs. | 6005 | % ash | 12·5 | % sulphur | 0·5 |
| 26. | Washed coal | " " | 4921 | " " | 6·2 | " " | 0·5 |
| 27. | Refuse | " " | 652 | " " | 50·7 | " " | .... |
| 28. | Other products | " " | 340 | " " | .... | " " | .... |
| 29. | Loss | " " | 92 | " " | .... | " " | .... |
| 30. | Loss in % 1·5. | | | | | | |

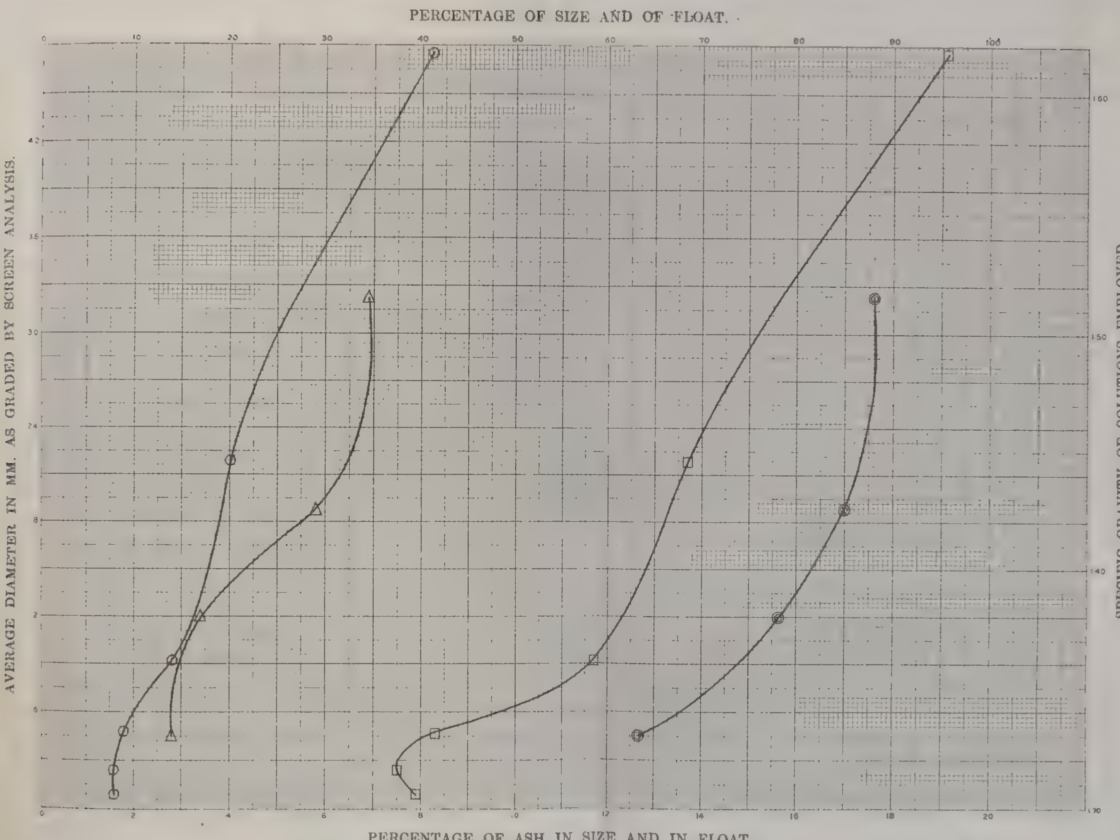
TABLE E.

### Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. . % | 82·0 | Ratio to standard | 93·7 |
| 32. | Reduction in ash % | 50·4 | " " | 109·2 |
| 33. | " " sulphur % | .... | " " | .... |
| 34. | Increase in calorific value—calorimeter % | 7·9 | | |
| 35. | Increase in evaporation under boiler % | 5·3 | | |
| 36. | Decrease in clinker under boiler % | 59·8 | | |
| 37. | Fuel ratio of original coal | 2·53 | | |
| 38. | " " washed " | 2·70 | | |
| 39. | Calorific value of original coal | 7370 | | |
| 40. | " " washed " | 7950 | | |

*Remarks on Tables C, D, and E.*—This washing test may be considered a very satisfactory one, although the loss is higher than would have been the case in a commercial operation. It must be noted that this sample is of screened coal, and, therefore, presumably of better quality than the ordinary run of mine. Possibly the latter would be more suitable for washing, particularly as it is largely used for the manufacture of coal, in which ash is very undesirable.

GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.

△ " " " " " " " " densities.

□ " " " percentage of ash in each of the several sizes.

◎ " " " " " " " material floating at the several densities.

COAL No. 31

APPENDIX I, VOL. III

## COAL.—No. 30.

*Locality.*—Michel, B.C.

*Colliery.*—Crowsnest Pass Coal Co., Michel, No. 7 mine.

*Sample.*—One hundred and fifty bags from a new mine, which was, at the time, undergoing development. The sample was taken from sixteen mine cars, selected from different parts of the mine. The coal was screened on 2″, and then run over the picking belt. Sampled April 29, 1908.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·525 | 89·3 | 6·0 | 10·5 | 55·6 |
| 2. | 1·420 | 83·8 | ... | 16·2 | 43·0 |
| 3. | 1·370 | 80·3 | 4·3 | 19·7 | 42·0 |
| 4. | 1·320 | 68·4 | 3·5 | 31·7 | 27·5 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 80·8 | % ash | 4·3 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 9·2 | " " | 23·2 |
| 7. | Useful coal—sum of (5) and (6) | " " | 90·0 | " " | 6·2 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 10·0 | " " | 60·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 11·9 |
| 10. | " " " " " " | | | % sulphur | 0·4 |
| 11. | " " " " " " | | | Fuel Ratio | 2·90 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 3·09 |

*Remarks.*—The innate ash is medium in amount ; the bone coal is rather low, but with high ash ; and the refuse is considerable, also with high ash. The ash can, therefore, be reduced considerably by washing.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 43·0 | 15·5 |
| 14. | 3·16 | 1·20 | 2·18 | 16·4 | 10·3 |
| 15. | 1·20 | 0·64 | 0·92 | 13·3 | 9·2 |
| 16. | 0·64 | 0·30 | 0·47 | 9·4 | 8·4 |
| 17. | 0·30 | 0·173 | 0·24 | 8·7 | 8·2 |
| 18. | 0·173 | 0·000 | 0·086 | 9·2 | 9·6 |

*Remarks.*—The coal is very similar to others from the same field, but is somewhat less friable. It may be noted, however, that the fine sizes contain more ash than do the same sizes in the other coals of the same district.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | This sample was not washed. | | | | | |
| 20. | Washed coal.... | | | | | | |
| 21. | Refuse—coarse.. | | | | | | |
| 22. | Hutch product.. | | | | | | |
| 23. | Jig slimes. ..... | | | | | | |
| 24. | Table slimes.... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal ........................ | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. | Washed coal........................ | " " | .... | " " | .... | " " | .... |
| 27. | Refuse........................... | " " | .... | " " | .... | " " | .... |
| 28. | Other products..................... | " " | .... | " " | .... | " " | .... |
| 29. | Loss.............................. | " " | .... | " " | .... | " " | .... |
| 30. | Loss in % | | | | | | |

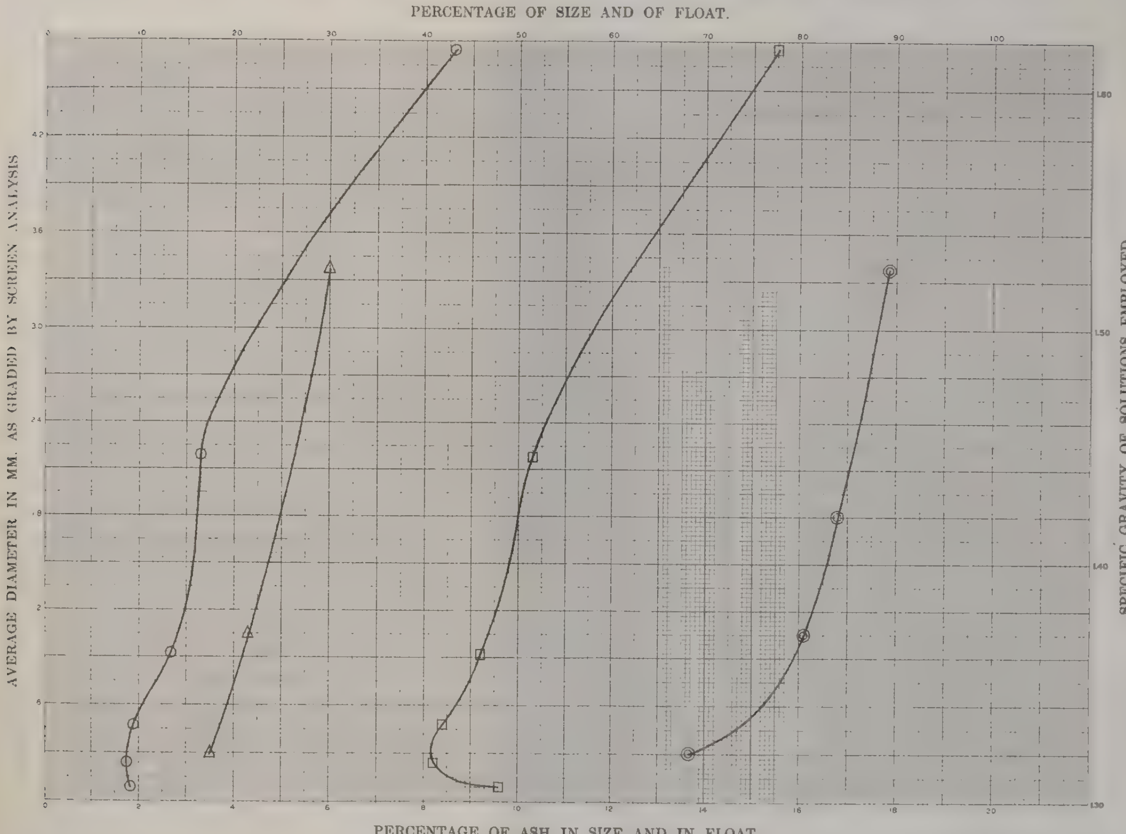
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone....% | .... | Ratio to standard | .... |
| 32. | Reduction in ash...............................% | .... | " " | .... |
| 33. | " " sulphur...........................% | .... | " " | .... |
| 34. | Increase in calorific value—calorimeter..........% | | | |
| 35. | Increase in evaporation under boiler.............% | .... | | |
| 36. | Decrease in clinker under boiler.................% | .... | | |
| 37. | Fuel ratio of original coal...................... | .... | | |
| 38. | " " washed " ..................... | .... | | |
| 39. | Calorific value of original coal.................. | .... | | |
| 40. | " " washed " ................. | .... | | |

*Remarks on Tables C, D, and E.*—The results of preliminary tests were such that it was not considered necessary to wash this coal.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. 30
Appendix I, Vol. III

## COAL.—No. 29.

*Locality.*—Michel, B.C.

*Colliery.*—Crowsnest Pass Coal Co., Michel colliery, No. 8 mine.

*Sample.*—One hundred and seventy-five sacks, chiefly drawn from No. 2 district, where the face is about 1,500 feet from the mouth of the tunnel. The sample had been screened on 2″, and then hand picked by boys. Sampled April 28, 1908.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·535 | 89·7 | 4·6 | 10·3 | 58·7 |
| 2. | 1·415 | 84·1 | 3·7 | 15·9 | 45·0 |
| 3. | 1·375 | 80·0 | 3·2 | 20·0 | 38·0 |
| 4. | 1·325 | 72·0 | 2·6 | 28·0 | 29·4 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 80·0 | % ash | 3·2 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 10·0 | " " | 17·7 |
| 7. | Useful coal—sum of (5) and (6) | " " | 90·0 | " " | 4·6 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 10·0 | " " | 60·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 10·2 |
| 10. | " " " " " " | | | % sulphur | 0·6 |
| 11. | " " " " " " | | | Fuel Ratio | 2·72 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 2·80 |

*Remarks.*—This coal is similar to that from Coal Creek, but the bone is exceedingly low in ash. As a large proportion of the impurity is in the refuse, the coal would wash well if it were considered necessary.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 31.0 | 14·9 |
| 14. | 3·16 | 1·20 | 2·18 | 16·9 | 13·1 |
| 15. | 1·20 | 0·64 | 0·92 | 14·0 | 11·5 |
| 16. | 0·64 | 0·30 | 0·47 | 11·0 | 9·5 |
| 17. | 0·30 | 0·173 | 0·24 | 12·0 | 7·6 |
| 18. | 0·173 | 0·000 | 0·086 | 16·1 | 6·7 |

*Remarks.*—This coal is apparently even more friable than the samples from Coal Creek, but in general is very similar to them, the pure coal being much weaker than the ash-bearing material.

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal ... | This sample was not washed. | | | | | |
| 20. Washed coal.... | | | | | | |
| 21. Refuse—coarse.. | | | | | | |
| 22. Hutch product.. | | | | | | |
| 23. Jig slimes. ..... | | | | | | |
| 24. Table slimes.... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | |
|---|---|---|---|---|---|---|
| 25. Original coal ........................ | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. Washed coal......................... | " " | .... | " " | .... | " " | .... |
| 27. Refuse............................ | " " | .... | " " | .... | " " | .... |
| 28. Other products...................... | " " | .... | " " | .... | " " | .... |
| 29. Loss. .............................. | | .... | | .... | | .... |
| 30. Loss in % . | | | | | | |

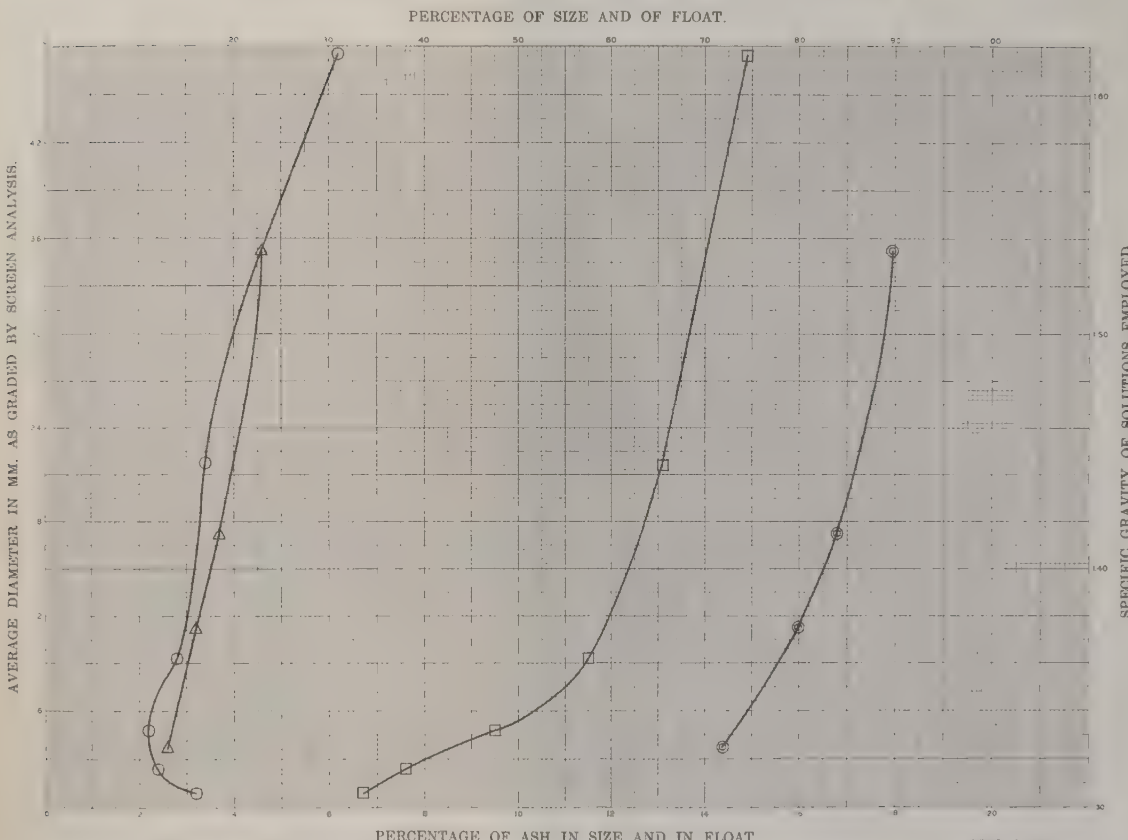
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone. .. | % | .... | Ratio to standard | .... |
| 32. Reduction in ash............................ | % | .... | " " | .... |
| 33. " " sulphur. ........................ | % | .... | " " | .... |
| 34. Increase in calorific value—calorimeter ......... | % | .... | | |
| 35. Increase in evaporation under boiler............ | % | .... | | |
| 36. Decrease in clinker under boiler................ | % | .... | | |
| 37. Fuel ratio of original coal..................... | | .... | | |
| 38. " " washed " ..................... | | .... | | |
| 39. Calorific value of original coal................. | | .... | | |
| 40. " " washed " ................. | | .... | | |

*Remarks on Tables C, D, and E.*—The results of preliminary tests were such that it was not considered necessary to wash this coal.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No 29
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

## COAL.—No. 51.

*Locality.*—Hosmer, B.C.

*Colliery.*—Hosmer Mines, Ltd., Hosmer mine, No. 2 seam.

*Sample.*—Forty-five bags from No. 2 seam, 1,600 feet in on main cross-cut and 740 feet to the south. Coal was run of mine without any cleaning at mine. Lumps of slate over $1\frac{1}{2}''$ were, however, removed by hand before preparing the sample for the laboratory tests. Sampled July 24, 1909.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·554 | 86·0 | 8·4 | 14·0 | 54·7 |
| 2. | 1·440 | 67·3 | 6·6 | 32·7 | 35·5 |
| 3. | 1·378 | 55·8 | 4·6 | 44·2 | 29·5 |
| 4. | 1·340 | 31·9 | 3·5 | 68·1 | 22·6 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 55·0 | % ash | 4·5 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 30·3 | " " | 15·1 |
| 7. | Useful coal—sum of (5) and (6) | " " | 85·3 | " " | 8·3 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 14·7 | " " | 58·6 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 15·3 |
| 10. | " " " " " " | | | % sulphur | 0·3 |
| 11. | " " " " " " | | | Fuel Ratio | 2·90 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—This sample should be compared with samples 52 and 53, which were taken at the same time from seams higher in the measures, but with more cover. As the depth increases the proportions of both good and useful coal increase and the ash decreases, while the refuse which is high in 51 becomes quite low in 53.

All of these coals can be improved by washing, but as the workings get deeper it is probable that washing will be unnecessary, unless for the manufacture of high grade coke.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample. | % Ash in size. |
|---|---|---|---|---|---|
| 13. | .... | .... | .... | .... | .... |
| 14. | .... | .... | .... | .... | .... |
| 15. | .... | .... | .... | .... | .... |
| 16. | .... | .... | .... | .... | .... |
| 17. | .... | .... | .... | .... | .... |
| 18. | .... | .... | .... | .... | .... |

*Remarks on Table B.*—No screen analyses were made on this coal.

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal... | Not washed. | | | | | |
| 20. Washed coal... | | | | | | |
| 21. Refuse—coarse. | | | | | | |
| 22. Hutch product. | | | | | | |
| 23. Jig slimes ..... | | | | | | |
| 24. Table slimes... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | |
|---|---|---|---|---|---|---|
| 25. Original coal.................... | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. Washed coal.................... | " " | .... | " " | .... | " " | .... |
| 27. Refuse.................... | " " | .... | " " | .... | " " | .... |
| 28. Other products.................... | " " | .... | " " | .... | " " | .... |
| 29. Loss.................... | | .... | | | | |
| 30. Loss in % | | | | | | |

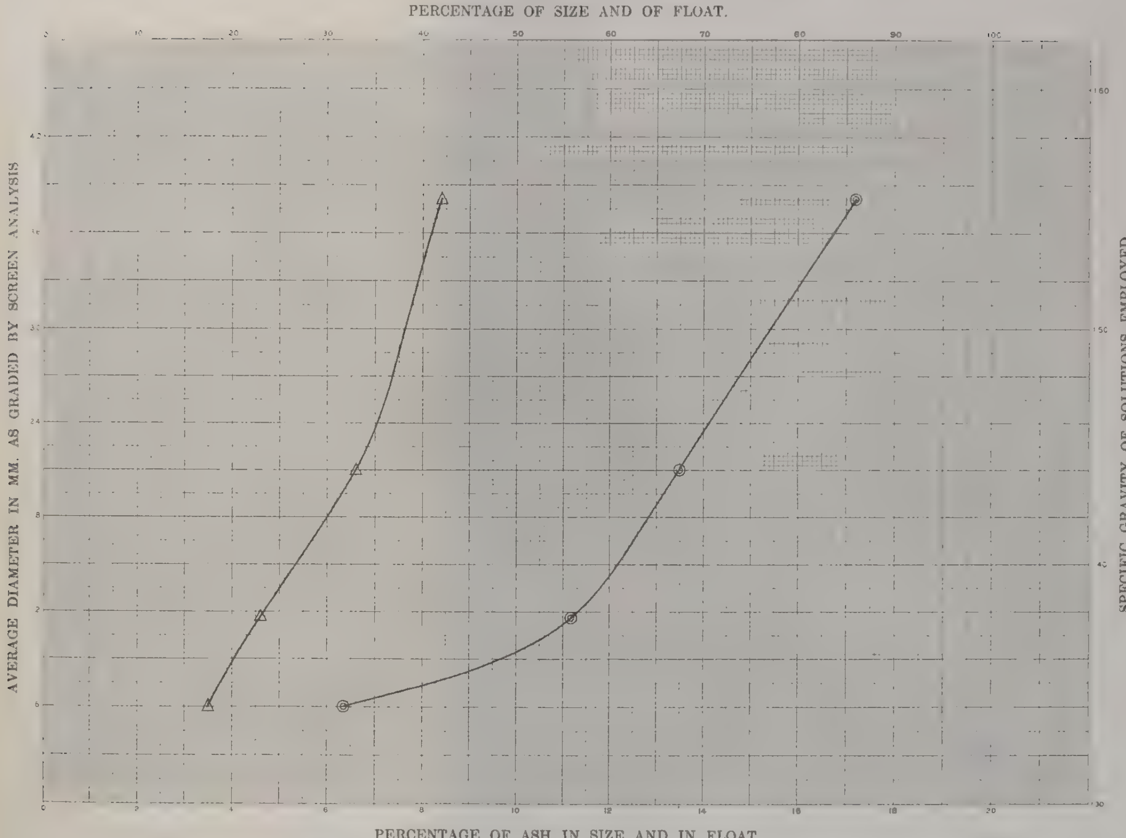
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone.. | % | .... | Ratio to standard | .... |
| 32. Reduction in ash.................... | % | .... | " " | .... |
| 33. " " sulphur.................... | % | .... | " " | .... |
| 34. Increase in calorific value—calorimeter........ | % | .... | | |
| 35. Increase in evaporation under boiler........... | % | .... | | |
| 36. Decrease in clinker under boiler............... | % | .... | | |
| 37. Fuel ratio of original coal.................... | | | | |
| 38. " " washed " .................... | | | | |
| 39. Calorific value of original coal................ | | | | |
| 40. " " washed " ................ | | | | |

*Remarks on Tables C, D, and E.*—It was not considered necessary to wash this sample.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◙ " " " " " " " material floating at the several densities.

COAL No. 51
APPENDIX I, VOL. III

## COAL.—No. 52.

*Locality.*—Hosmer, B.C.

*Colliery.*—Hosmer Mines, Ltd., Hosmer mine, No. 6 seam.

*Sample.*—Forty-five bags from No. 6 seam, 3,355 feet in on the main cross-cut and 450 feet to the south.

Coal was run of mine without any cleaning at the mine. Lumps of slate over $1\frac{1}{2}''$ were, however, removed by hand at the laboratory before preparing the sample for the tests. Sampled July, 1909.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·550 | 86·2 | 7·0 | 13·8 | 59·9 |
| 2. | 1·426 | 79·9 | 5·5 | 20·1 | 43·1 |
| 3. | 1·375 | 69·0 | 4·2 | 31·0 | 33·4 |
| 4. | 1·325 | 57·1 | 3·9 | 42·9 | 24·3 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 69·0 | % ash | 4·2 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 17·2 | " " | 18.2 |
| 7. | Useful coal—sum of (5) and (6) | " " | 86·2 | " " | 7·0 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 13·8 | " " | 52·6 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 12·4 |
| 10. | " " " " " " | | | % sulphur | 0·6 |
| 11. | " " " " " " | | | Fuel Ratio | 2·42 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—This sample should be compared with samples 51 and 53' which were taken at the same time from other seams. As the depth of cover increases the proportions of both good and useful coal increase and the ash decreases, while the refuse which is high in 51 becomes quite low in 53.

All of these coals can be improved by washing, but as the workings get deeper it is probable that washing will be unnecessary unless for the manufacture of high grade coke.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample. | % Ash in size. |
|---|---|---|---|---|---|
| 13. | .... | .... | .... | .... | .... |
| 14. | .... | .... | .... | .... | .... |
| 15. | .... | .... | .... | .... | .... |
| 16. | .... | .... | .... | .... | .... |
| 17. | .... | .... | .... | .... | .... |
| 18. | .... | .... | .... | .... | .... |

*Remarks on Table B.*—No screen analysis was made on this sample.

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal .. | Not washed. | | | | | |
| 20. Washed coal... | | | | | | |
| 21. Refuse—coarse. | | | | | | |
| 22. Hutch product. | | | | | | |
| 23. Jig slimes. .... | | | | | | |
| 24. Table slimes... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. Original coal | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. Washed coal | " " | .... | " " | .... | " " | .... |
| 27. Refuse | " " | .... | " " | .... | " " | .... |
| 28. Other products | " " | .... | " " | .... | " " | .... |
| 29. Loss | " " | .... | " " | .... | " " | .... |
| 30. Loss in % | | | | | | |

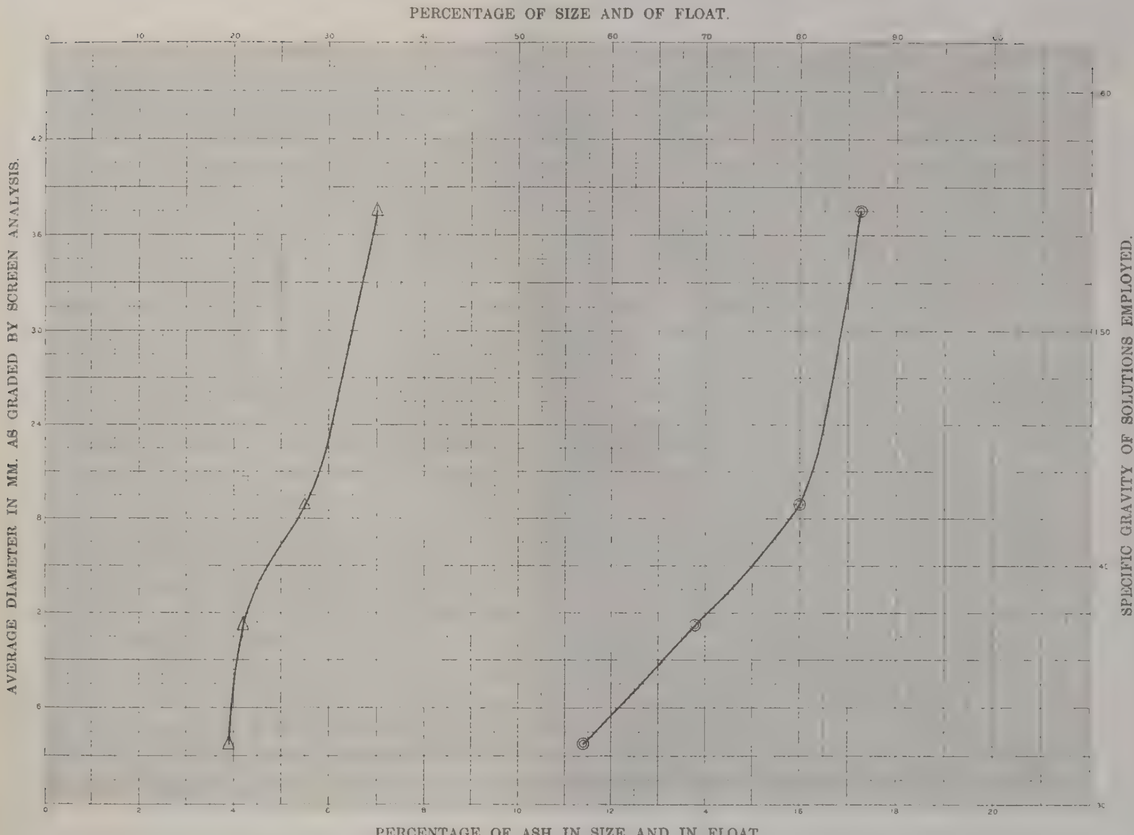
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone | % | .... | Ratio to standard | .... |
| 32. Reduction in ash | % | .... | " " | .... |
| 33. " " sulphur | % | .... | " " | .... |
| 34. Increase in calorific value—calorimeter | % | .... | | |
| 35. Increase in evaporation under boiler | % | .... | | |
| 36. Decrease in clinker under boiler | % | .... | | |
| 37. Fuel ratio of original coal | | | | |
| 38. " " washed " | | | | |
| 39. Calorific value of original coal | | | | |
| 40. " " washed " | | | | |

*Remarks on Tables C, D, and E.*—It was not considered necessary to wash this sample.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
⊡ " " " percentage of ash in each of the several sizes.
⊚ " " " " " " " material floating at the several densities.

COAL No. 52
APPENDIX I, VOL. III

## COAL.—No. 53.

*Locality.*—Hosmer, B.C.

*Colliery.*—Hosmer Mines, Ltd., Hosmer mine, No. 8 seam.*

*At the time this sample was taken the No. 8 was the deepest seam, and the highest stratigraphically that had been developed sufficiently to sample. Since then the No. 9 seam has been opened and has proved to be of better quality than any of the three sampled.

*Sample.*—Ten bags from No. 8 seam, 3,790 feet in on main cross-cut 85 feet to the south.

Coal was run of mine without any cleaning at mine. Lumps of slate over 1½" were, however, removed by hand before preparing the sample for the laboratory tests. Sampled July 24, 1909.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·554 | 93·6 | 3·9 | 6·4 | 56·2 |
| 2. | 1·421 | 90·8 | 3·3 | 9·2 | 46·6 |
| 3. | 1·375 | 87·9 | 2·9 | 12·1 | 37·2 |
| 4. | 1·325 | 81·7 | 2·7 | 18·3 | 28·3 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 87·9 | % ash | 2·9 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 5·7 | " " | 19·3 |
| 7. | Useful coal—sum of (5) and (6) | " " | 93·6 | " " | 3·9 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 6·4 | " " | 55·5 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 7·5 |
| 10. | " " " " " " | | | % sulphur | 0·6 |
| 11. | " " " " " " | | | Fuel Ratio | 2·30 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—This sample should be compared with samples 51 and 52, which were taken at the same time from seams lower in the measures but with less cover. As the depth of cover increases the proportions of both good and useful coal increase and the ash decreases, while the refuse, which is high in 51, becomes quite low in 53.

All these coals can be improved by washing, but as the workings get deeper it is probable that washing will be unnecessary, unless for the manufacture of high grade coke.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample. | % Ash in size. |
|---|---|---|---|---|---|
| 13. | .... | .... | .... | .... | .... |
| 14. | .... | .... | .... | .... | .... |
| 15. | .... | .... | .... | .... | .... |
| 16. | .... | .... | .... | .... | .... |
| 17. | .... | .... | .... | .... | .... |
| 18. | .... | .... | .... | .... | .... |

*Remarks on Table B.*—No screen analysis was made on this coal.

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal.... | Not washed. | | | | | |
| 20. Washed coal.... | | | | | | |
| 21. Refuse—coarse.. | | | | | | |
| 22. Hutch product.. | | | | | | |
| 23. Jig slimes ...... | | | | | | |
| 24. Table slimes.... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. Original coal........................ | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. Washed coal...................... | " " | .... | " " | .... | " " | .... |
| 27. Refuse.......................... | " " | .... | " " | .... | " " | .... |
| 28. Other products.................. | " " | .... | " " | .... | " " | .... |
| 29. Loss............................ | " " | .... | " " | .... | " " | .... |
| 30. Loss in % | | .... | | .... | | .... |

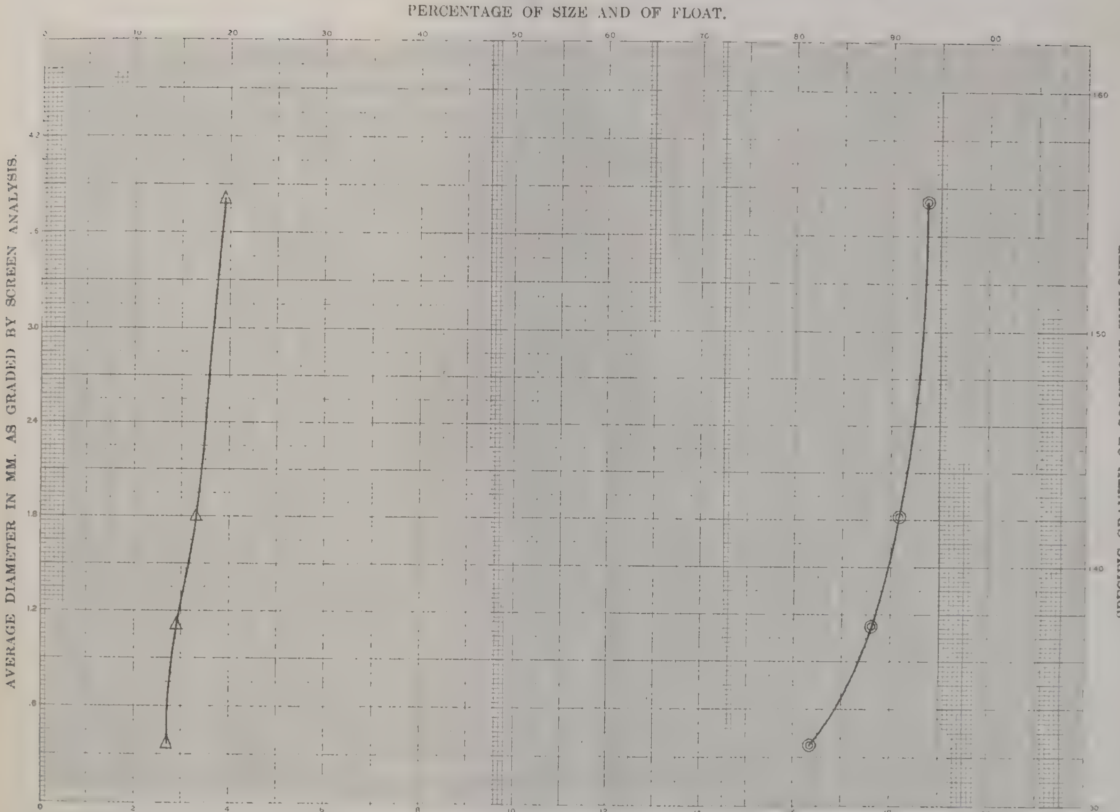
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone..% | .... | Ratio to standard | .... |
| 32. Reduction in ash..........................% | .... | " " | .... |
| 33. " " sulphur.........................% | .... | " " | .... |
| 34. Increase in calorific value—calorimeter........% | .... | | .... |
| 35. Increase in evaporation under boiler...........% | .... | | |
| 36. Decrease in clinker under boiler...............% | .... | | |
| 37. Fuel ratio of original coal.................... | | | |
| 38. " " washed " ..................... | | | |
| 39. Calorific value of original coal................ | | | |
| 40. " " washed " ................ | | | |

*Remarks on Tables C, D, and E.*—It was not considered necessary to wash this coal.

GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

Curve showing the relative quantities of the several sizes
" " " " " " " " densities
" " " percentage of ash in each of the several sizes
" " " " " " " material floating at the several densities

COAL No. 53
APPENDIX I. VOL. III

## COAL.—No. 27.

*Locality.*—Coal Creek, Fernie, B.C.

*Colliery.*—Crowsnest Pass Coal Co., Coal Creek, No. 2 mine.

*Sample.*—One hundred and forty-four bags of commercial screened coal from the No. 5 mine, on the north side of Coal creek. The coal was first screened on a 2″ shaking screen and then hand picked. Sampled April 25, 1908.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·510 | 87·9 | 3·3 | 12·1 | 53·2 |
| 2. | 1·430 | 85·6 | 2·6 | 14·4 | 46·8 |
| 3. | 1·370 | 83·2 | 2·4 | 16·8 | 42·0 |
| 4. | 1·320 | 80·2 | 2·2 | 19·8 | 36·1 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 83·5 | % ash | 2·4 |
| 6. | Bone coal, Sp. Gr., 1·375 to 1·55 | " " | 5·5 | " " | 21·4 |
| 7. | Useful coal—sum of (5) and (6) | " " | 89·0 | " " | 3·6 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 11·0 | " " | 56·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 9·0 |
| 10. | " " " " " " | | | % sulphur | 0·5 |
| 11. | " " " " " " | | | Fuel Ratio | 2·46 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 2·93 |

*Remarks.*—The coal is low in innate ash, and contains but little bone, although the latter is high in ash. There is a fairly large amount of refuse, with a medium proportion of ash. The coal could, therefore, be decidedly improved by washing if the circumstances justify it, but under present conditions this treatment is unnecessary, unless for high grade coke. The coal is on the whole one of the best in the whole series.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 38·1 | 15·5 |
| 14. | 3·16 | 1·20 | 2·18 | 15·8 | 8·9 |
| 15. | 1·20 | 0·64 | 0·92 | 14·7 | 7·4 |
| 16. | 0·64 | 0·30 | 0·47 | 10·7 | 7·0 |
| 17. | 0·30 | 0·173 | 0·24 | 10·4 | 5·7 |
| 18. | 0·173 | 0·000 | 0·086 | 10·3 | 7·6 |

*Remarks.*—The coal makes a large proportion of fines, which are comparatively low in ash. It is evident, therefore, that the pure coal is very much more friable than the ash-bearing material.

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal ... | This coal was not washed. | | | | | |
| 20. Washed coal.... | | | | | | |
| 21. Refuse—coarse.. | | | | | | |
| 22. Hutch product.. | | | | | | |
| 23. Jig slimes. ..... | | | | | | |
| 24. Table slimes.... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | |
|---|---|---|---|---|---|---|
| 25. Original coal........................ | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. Washed coal........................ | " " | .... | " " | .... | " " | .... |
| 27. Refuse........................... | " " | .... | " " | .... | " " | .... |
| 28. Other products..................... | " " | .... | " " | .... | " " | .... |
| 29. Loss.............................. | " " | .... | " " | .... | " " | .... |
| 30. Loss in % | | | | | | |

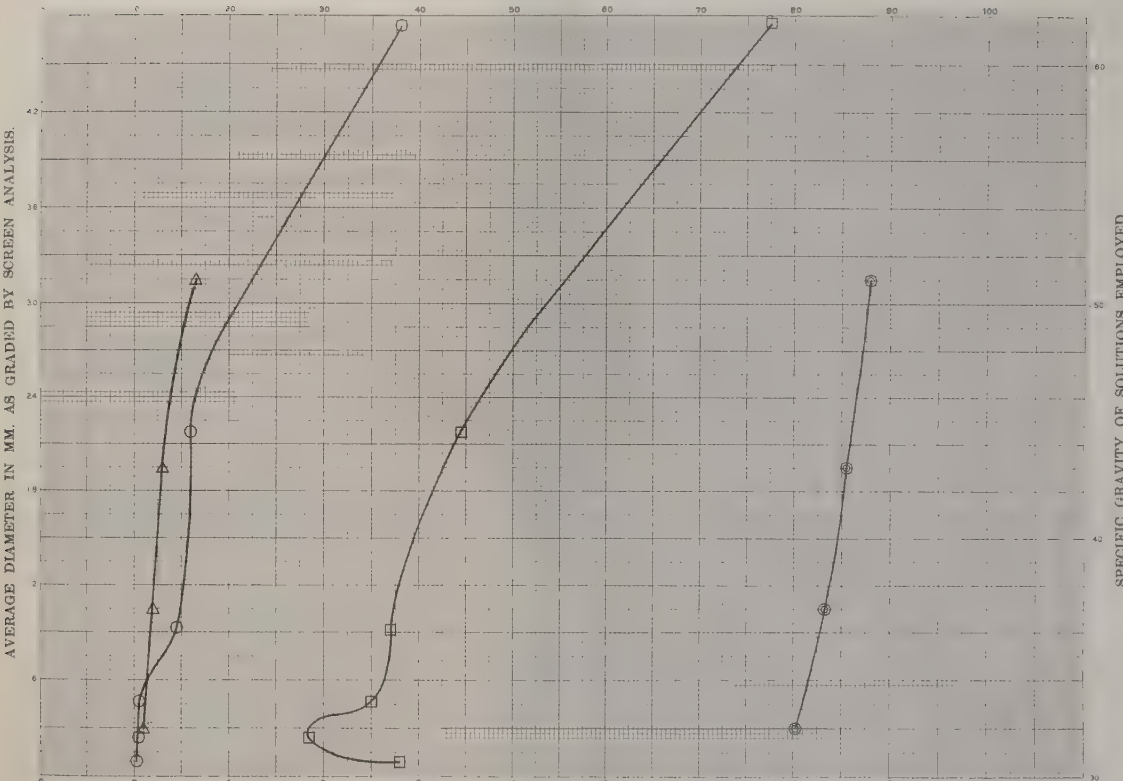
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone....% | .... | Ratio to standard | .... |
| 32. Reduction in ash.............................% | .... | " " | .... |
| 33. " " sulphur..........................% | .... | " " | .... |
| 34. Increase in calorific value—calorimeter .........% | .... | | |
| 35. Increase in evaporation under boiler............% | .... | | |
| 36. Decrease in clinker under boiler................% | .... | | |
| 37. Fuel ratio of original coal..................... | .... | | |
| 38. " " washed " ..................... | .... | | |
| 39. Calorific value of original coal.................. | .... | | |
| 40. " " washed " .................. | .... | | |

*Remarks on Tables C, D, and E.*—The results of preliminary tests were such that it was not considered necessary to wash this coal.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. 27
APPENDIX I, VOL. III

## COAL.—No. 26.

*Locality.*—Coal Creek, Fernie, B.C.

*Colliery.*—Crowsnest Pass Coal Co., No. 5 Coal Creek mine.

*Sample.*—One hundred and fifty-one sacks of commercial screened coal from the No. 5 mine, on the north side of Coal creek. The coal was first screened on a 2″ shaking screen and then hand picked. Sampled April 25, 1908.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·555 | 93·0 | 6·2 | 7·0 | 69·1 |
| 2. | 1·410 | 88·3 | 5·1 | 11·7 | 50·6 |
| 3. | 1·375 | 84·7 | 4·6 | 13·3 | 41·1 |
| 4. | 1·335 | 75·8 | 3·1 | 24·2 | 33·6 |

The following results are obtained from the above data, and from the chemists results:—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 84·7 | % ash | 4·6 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 8·3 | " " | 23·2 |
| 7. | Useful coal—sum of (5) and (6) | " " | 93·0 | " " | 6·2 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 7·0 | " " | 69·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 10·8 |
| 10. | " " " " " " | | | % sulphur | 0·5 |
| 11. | " " " " " " | | | Fuel Ratio | 2·72 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 2·69 |

*Remarks.*—This coal has a medium proportion of innate ash and rather small proportions of bone and refuse, both high in ash. A considerable reduction in ash could be made by washing, but the original coal is good enough for present purpose, and, therefore, washing is not justifiable, except for high grade coke.

TABLE B.

### Results of Washing (Details of Sizes).

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 40·2 | 16·5 |
| 14. | 3·16 | 1·20 | 2·18 | 13·8 | 11·7 |
| 15. | 1·20 | 0·64 | 0·92 | 12·2 | 10·0 |
| 16. | 0·64 | 0·30 | 0·47 | 9·3 | 9·0 |
| 17. | 0·30 | 0·173 | 0·24 | 10·9 | 7·6 |
| 18. | 0·173 | 0·000 | 0·086 | 13·6 | 7·4 |

*Remarks.*—The proportion of fines is very large, and the low ash in the fine sizes indicates that the coal is much more friable than its ash-bearing material. The amount of ash in the coarser lumps is surprisingly high, in comparison with the analysis of the whole sample.

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal .............. | This coal was not washed. | | | | | |
| 20. Washed coal................ | | | | | | |
| 21. Refuse—coarse............. | | | | | | |
| 22. Hutch product............. | | | | | | |
| 23. Jig slimes.................. | | | | | | |
| 24. Table slimes............... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | |
|---|---|---|---|---|---|---|
| 25. Original coal ........................ | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. Washed coal......................... | " " | .... | " " | .... | " " | .... |
| 27. Refuse................................ | " " | .... | " " | .... | " " | .... |
| 28. Other products...................... | " " | .... | " " | .... | " " | .... |
| 29. Loss................................... | " " | .... | " " | .... | " " | .... |
| 30. Loss in % | | | | | | |

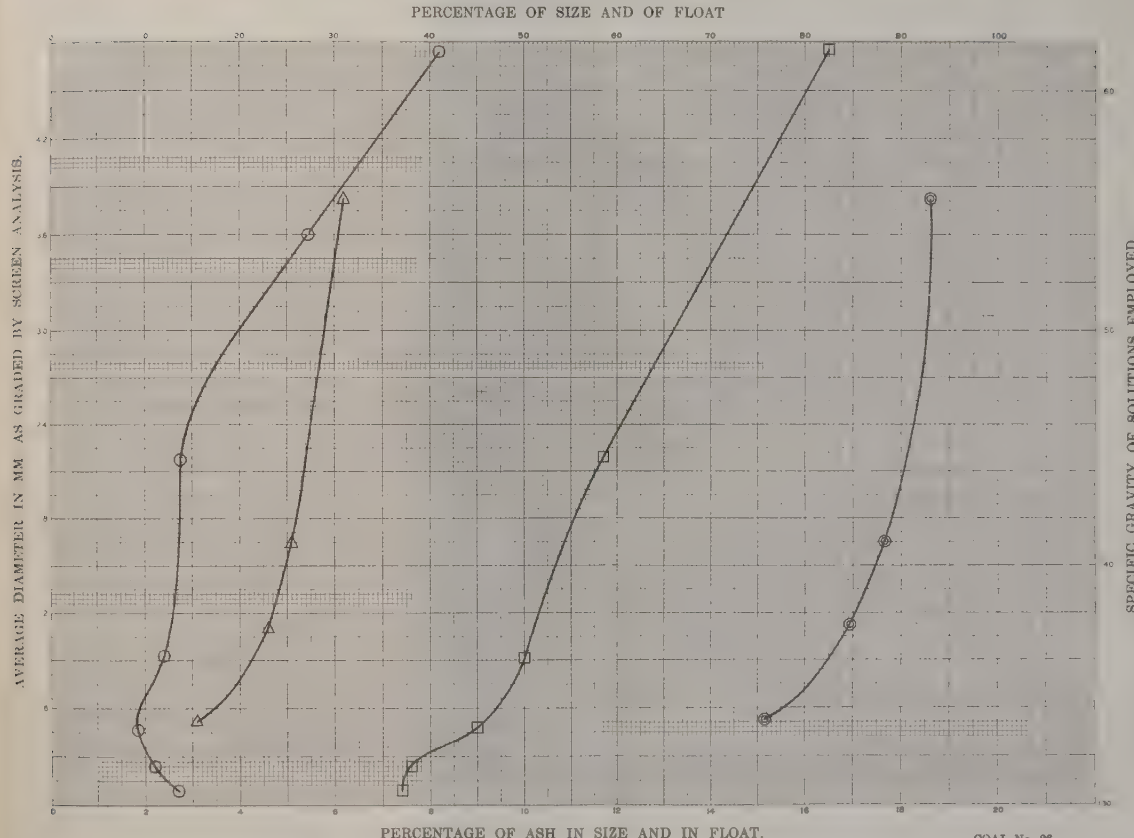
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | |
|---|---|---|---|
| 31. Recovery of washed coal, including good bone....% | .... | Ratio to standard | .... |
| 32. Reduction in ash.............................% | .... | " " | .... |
| 33. " " sulphur.........................% | .... | " " | .... |
| 34. Increase in calorific value—calorimeter..........% | | | |
| 35. Increase in evaporation under boiler............% | .... | | |
| 36. Decrease in clinker under boiler................% | .... | | |
| 37. Fuel ratio of original coal..................... | .... | | |
| 38. " " washed " ..................... | .... | | |
| 39. Calorific value of original coal.................. | .... | | |
| 40. " " washed " ................. | .... | | |

*Remarks on Tables C, D, and E.*—The results of preliminary tests were such that it was not considered necessary to wash this coal.

GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 26
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

# THE CASCADE COAL BASIN.

## ERRATUM

On the curve diagrams accompanying the tabulated records of each of the coals tested, is the following legend:—

### LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

The above legend is incorrect; in each case it should read thus:—

○ Curve showing the relative quantities of the several sizes.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " material floating at the several densities.
△ " " " " " ash in " " " " "

## COAL.—No. 25.

*Locality.*—Cascade coal field, Canmore, Alberta.

*Colliery.*—H. W. McNeil Co., Old No. 1 mine.

*Sample.*—One hundred and fifty bags from the east workings of the old mine. The sample, as it came from the mine, was screened, and the lump portion, approximately one-fourth of the whole, was hand picked, the lumps then being returned to the screenings, and the whole sacked. The sample may, therefore, be said to consist of 75 per cent run of mine and 25 per cent of hand picked lump. Sampled April 22, 1908.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·525............. | 84·3 | 3·4 | 15·7 | 48·6 |
| 2. | 1·400............. | 83·0 | ... | 17·0 | .... |
| 3. | 1·380............. | 75·4 | 2·1 | 24·6 | 38·0 |
| 4. | 1·320............. | 67·3 | 2·0 | 32·7 | 28·7 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375...................... | % yield | 74·5 | % ash | 2·5 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55...................... | " " | 9·5 | " " | 13·2 |
| 7. | Useful coal—sum of (5) and (6)...................... | " " | 84·0 | " " | 3·7 |
| 8. | Refuse, Sp. Gr. over 1·55........................... | " " | 16·0 | " " | 50·6 |
| 9. | Assay of original sample raw coal as sent to chemist.............. | | | " " | 12·3 |
| 10. | " " " " " " .............. | | | % sulphur | 0·8 |
| 11. | " " " " " " .............. | | | Fuel Ratio | 4·10 |
| 12. | Assay of mixed good and bone coal (5) and (6).................... | | | " " | 5·12 |

*Remarks.*—The innate ash in this coal is very high, and the amount of bone coal moderate, and with rather high ash, while the refuse is high, although low in ash. The coal can be considerably improved by washing, as so large a proportion of the ash is in the refuse. This coal is anthracitic in character, although by no means a true anthracite.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 42·0 | 12·9 |
| 14. | 3·16 | 1·20 | 2·18 | 18·7 | 12·0 |
| 15. | 1·20 | 0·64 | 0·92 | 14·5 | 10·4 |
| 16. | 0·64 | 0·30 | 0·47 | 9·6 | 10·3 |
| 17. | 0·30 | 0·173 | 0·24 | 8·5 | 8·7 |
| 18. | 0·173 | 0·000 | 0·086 | 6·7 | 8·3 |

*Remarks.*—The decreasing proportion of ash in the finer sizes shows that the coal is more friable than the ash-bearing material, and this is par-

ticularly noticeable, as the sample contained a large amount of screenings, which, ordinarily, are high in ash. In the circumstances, the proportion of fines is not large and their impurity not unexpectedly great. The coal is hard, and stands handling and shipment fairly well.

TABLE C.

**Results of Washing (Details of Sizes).**

| | Original coal and its products. | Sizes between 1" and ½" Total wt. lbs. | Ash. % | Sizes between ½" and ⅛" Total wt. lbs. | Ash. % | Sizes under ⅛" Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal | 2275 | 13·4 | 2045 | 9·5 | 2540 | 9·2 |
| 20. | Washed coal | 1863 | 6·8 | 1761 | 5·0 | 1643 | 5·8 |
| 21. | Refuse—coarse | 360 | 59·8 | 189 | 51·5 | 142 | 44·4 |
| 22. | Hutch product | 38 | 16·6 | 90 | 29·5 | .... | .... |
| 23. | Jig slimes | .... | .... | 12 | .... | .... | .... |
| 24. | Table slimes | .... | .... | .... | .... | 330 | 6·4 |

TABLE D.

**Results of Washing (Totals).**

| | | | | | |
|---|---|---|---|---|---|
| 25. | Original coal | wt. in lbs. 6860 | % ash 12·3 | % sulphur | 0·8 |
| 26. | Washed coal | " " 5597 | " " 5·9 | " " | 0·7 |
| 27. | Refuse | " " 691 | " " 54·1 | " " | .... |
| 28. | Other products | " " 481 | " " .... | " " | .... |
| 29. | Loss | " " 91 | " " .... | " " | .... |
| 30. | Loss in % 1·3 | | | | |

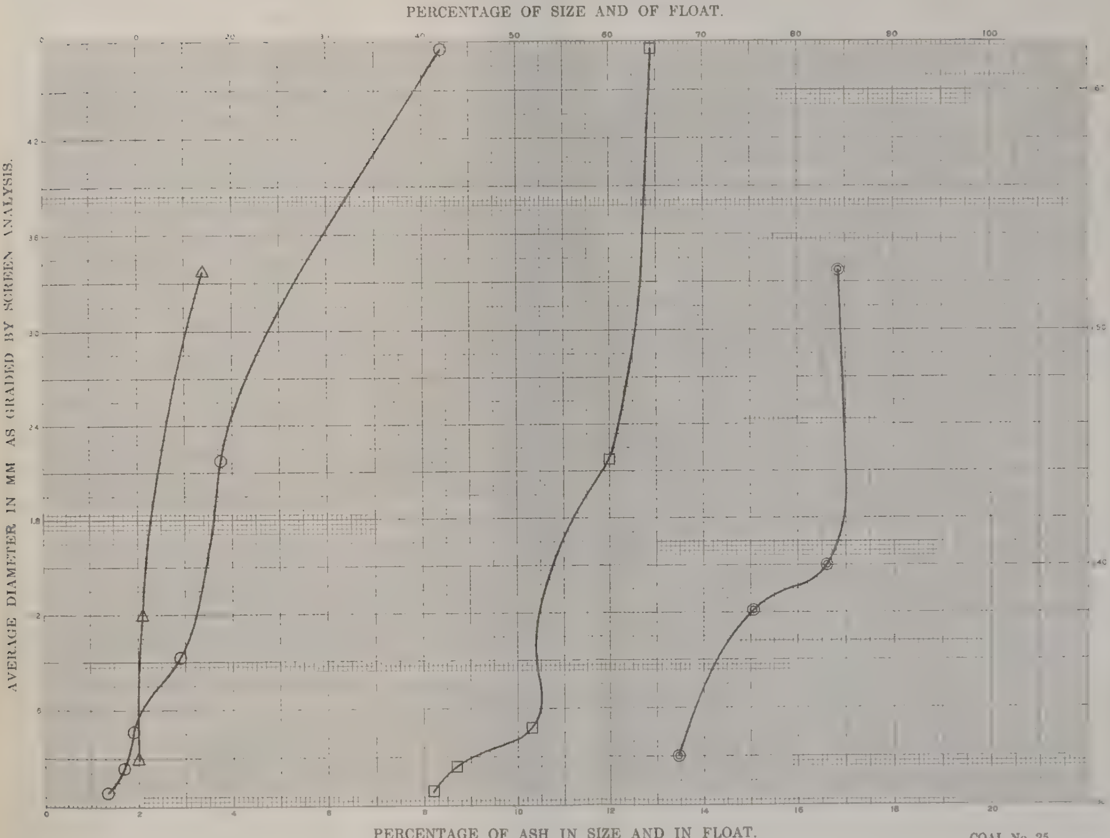
TABLE E.

**Summary Statement of Effect of Washing on Fuel Values.**

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone . . . % | 81·5 | Ratio to standard | 97·0 |
| 32. | Reduction in ash % | 52·0 | " " | 62·7 |
| 33. | " " sulphur % | 12·5 | " " | .... |
| 34. | Increase in calorific value—calorimeter % | 9·0 | " " | |
| 35. | Increase in evaporation under boiler % | 13·1 | | |
| 36. | Decrease in clinker under boiler % | 43·2 | | |
| 37. | Fuel ratio of original coal | 4·10 | | |
| 38. | " " washed " | 4·80 | | |
| 39. | Calorific value of original coal | 7340 | | |
| 40. | " " washed " | 8000 | | |

*Remarks on Tables C, D, and E.*—This trial was fairly satisfactory, and the washed coal proved decidedly better than the unwashed, both in chemical tests and in practical treatment.

GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 25
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

**COAL.—No. 23 M.**

*Locality.*—Cascade coal field, Banff, Alberta.

*Colliery.*—Bankhead colliery.

*Sample.*—This coal is a mixture of two sizes of dry cleaned coal from the Bankhead plant.

Sixty sacks of pea coal, drawn from the bunkers. This coal was mined between April 18 and 20, 1908, and had received the usual treatment ; that is to say, it had been through a $\frac{7}{8}''$ screen and on $\frac{7}{16}''$, and had been cleaned by slater bars and Emery picker.

Sixty sacks of buckwheat No. 1 taken from the bunkers, as above. These sizes had passed through $\frac{7}{16}''$ screen and on $\frac{7}{16}''$ : it had been cleaned on the slate picker, but not on the Emery picker. Sampled April 21, 1908.

TABLE A.

**Specific Gravity Tests.**

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·510 | 78·3 | 6·2 | 21·7 | 45·7 |
| 2. | 1·430 | 73·9 | 4·6 | 26·1 | 41·9 |
| 3. | 1·375 | 58·0 | 2·7 | 42·0 | 34·6 |
| 4. | 1·340 | 42·3 | 2·0 | 57·7 | 24·0 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 58·0 | % ash | 2·7 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 21·0 | " " | 17·2 |
| 7. | Useful coal—sum of (6) and (7) | " " | 79·0 | " " | 6·0 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 21·0 | " " | 46·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 14·1 |
| 10. | " " " " " " | | | % sulphur | 0·6 |
| 11. | " " " " " " | | | Fuel Ratio | 5·80 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 6·51 |

*Remarks.*—The specific gravity solutions used in this investigation were chosen for bituminous coals, and are rather low in gravity for an anthracite such as this Bankhead material. It would probably be more just to take 1·6 as the dividing point between coal and refuse. If so, the float, or useful coal, would amount to 83 per cent, with about $7\frac{1}{2}$ per cent of ash, while the refuse would carry 50 per cent of ash.

This coal can be greatly improved by washing, or equivalent treatment, as the innate ash is low and the amount of refuse large, although with comparatively low ash.

TABLE B.

**Screen Analysis.**

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 77·9 | 14·8 |
| 14. | 3·16 | 1·20 | 2·18 | 12·2 | 11·9 |
| 15. | 1·20 | 0·64 | 0·92 | 5·4 | 11·7 |
| 16. | 0·64 | 0·30 | 0·47 | 2·2 | 10·0 |
| 17. | 0·30 | 0·173 | 0·24 | 1·5 | 15·3 |
| 18. | 0·173 | 0·000 | 0·086 | 0·8 | 18·8 |

*Remarks.*—The sample was of cleaned and screened coal, and, therefore, the amount of fines made, even in crushing it to $\frac{1}{4}''$, was small. The large percentage of ash in the finest sizes probably indicates the presence in the sample of some fine dirt from the original coal.

TABLE C.

**Results of Washing (Details of Sizes).**

| | Original coal and its products. | Sizes between 1″ and $\frac{1}{2}''$ Total wt. lbs. | Ash. % | Sizes between $\frac{1}{2}''$ and $\frac{1}{8}''$ Total wt. lbs. | Ash. % | Sizes under $\frac{1}{8}''$ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal | 4387 | 14·6 | 1940 | 12·7 | 552 | 12·0 |
| 20. | Washed coal | 3890 | 8·9 | 1588 | 7·3 | 309 | .... |
| 21. | Refuse—coarse | 438 | 57·2 | 164 | 56·4 | 36 | .... |
| 22. | Hutch product | 50 | 37·0 | 125 | 38·0 | .... | .... |
| 23. | Jig slimes | .... | .... | 81 | 29·7 | .... | .... |
| 24. | Table slimes | .... | .... | .... | .... | 35 | 13·1 |

TABLE D.

**Results of Washing (Totals).**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal | wt. in lbs. | 6879 | % ash | 14·1 | % sulphur | 0·6 |
| 26. | Washed coal | " " | 5787 | " " | 8·9 | " " | 0·6 |
| 27. | Refuse | " " | 638 | " " | 55·4 | " " | .... |
| 28. | Other products | " " | 293 | " " | .... | " " | .... |
| 29. | Loss | " " | 161 | " " | .... | " " | .... |
| 30. | Loss in % 2·3 | | | | | | |

TABLE E.

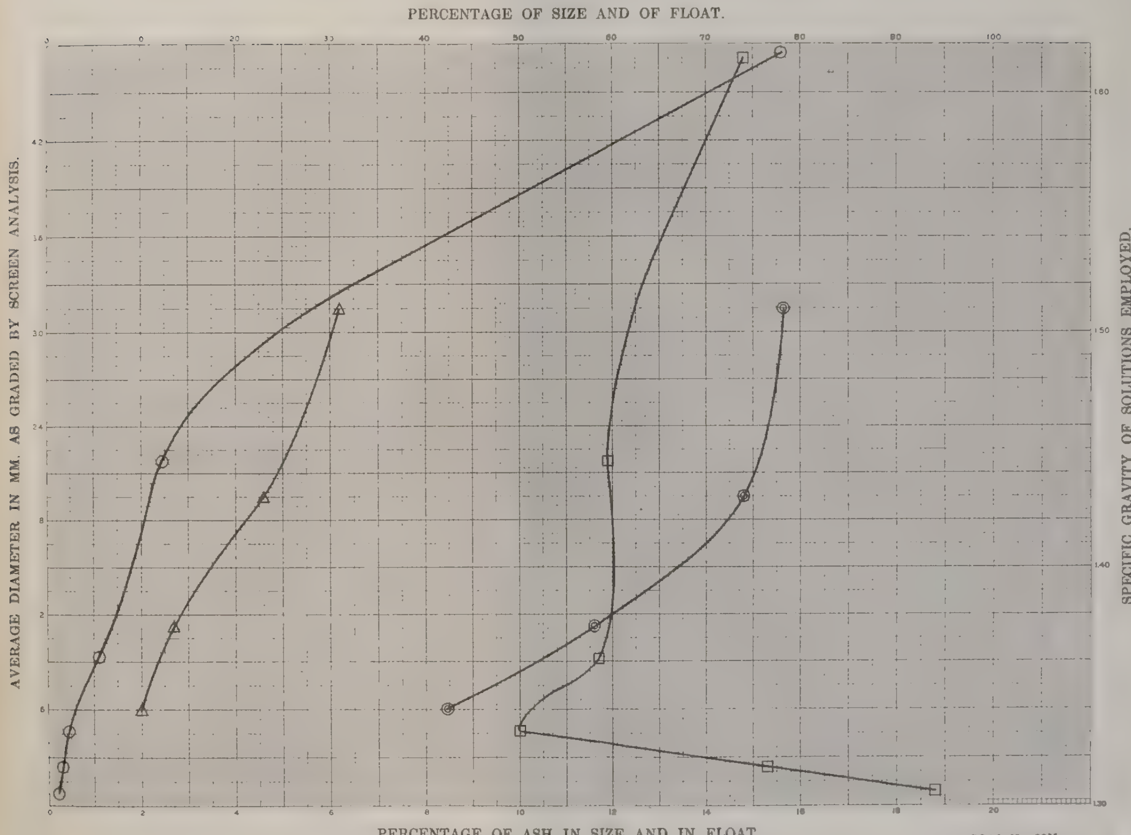
**Summary Statement of Effect of Washing on Fuel Values.**

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. . % | 84·0 | Ratio to standard | 106·2 |
| 32. | Reduction in ash % | 36·9 | " " | 67·4 |
| 33. | " " sulphur % | 0·0 | " " | .... |
| 34. | Increase in calorific value—calorimeter % | 6·7 | | |
| 35. | Increase in evaporation under boiler % | 14·1 | | |
| 36. | Decrease in clinker under boiler % | 36·7 | | |
| 37. | Fuel ratio of original coal | 5·80 | | |
| 38. | " " washed " | 6·29 | | |
| 39. | Calorific value of original coal | 7270 | | |
| 40. | " " washed " | 7760 | | |

*Remarks on Tables C, D, and E.*—In washing this sample, a deliberate attempt was made to work to a somewhat higher specific gravity than would have been desirable with ordinary bituminous coal. Therefore, the recovery of washed coal is somewhat higher than that intimated by the preliminary trials, in Table A. The washed coal also contains more ash. The results of this test were also somewhat affected by the accidental loss of a considerable amount of very fine dust. As this dust, however, is only useful in practice for briquetting, it is probable that the results do not differ greatly from what would be the results of commercial washing.

It should be pointed out that this sample had already been treated in a dry washer, or "slater" plant. The improvement, therefore, is considerably less than it would have been had run of mine coal been available.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 23M
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
⊙ " " " " " " " material floating at the several densities.

COAL.—No. EX. 1.

*Locality.*—Granite Creek, Princeton district, B.C.

*Colliery.*—Prospecting tunnel, No. 1.

*Sample.*—This sample of about 150 pounds was taken by Dr. Porter in June, 1908, at the face of the tunnel. It correctly represents the workable bench at about 100 feet in from the surface, but the coal may improve somewhat with depth.

TABLE A.

**Specific Gravity Tests.**

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·530 | 91·0 | 8·1 | 9·0 | 55·7 |
| 2. | 1·410 | 87·0 | 6·9 | 13·0 | 48·1 |
| 3. | 1·370 | 83·5 | 5·7 | 16·5 | 43·7 |
| 4. | 1·320 | 52·5 | 3·4 | 47·5 | 21·1 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 84·0 | % ash | 5·9 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 7·5 | " " | 25·0 |
| 7. | Useful coal—sum of (5) and (6) | " " | 91·5 | " " | 8·2 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 8·5 | " " | 56·7 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 12·3 |
| 10. | " " " " " " | | | % sulphur | .... |
| 11. | " " " " " " | | | Fuel Ratio | 1·60 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—The innate ash is a little higher than usual, but this is possibly due to the sample having been taken in a shallow prospecting tunnel, and comparatively near the surface. Bone coal and refuse are comparatively small in quantity, but they are high in ash.

The coal would wash well, but the best results could only be got by lowering the standard for refuse to a little below 1·55 specific gravity.

TABLE B.

**Screen Analysis.**

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | .... |
| 14. | 3·16 | 1·20 | 2·18 | .... | .... |
| 15. | 1·20 | 0·64 | 0·92 | .... | .... |
| 16. | 0·64 | 0·30 | 0·47 | .... | .... |
| 17. | 0·30 | 0·173 | 0·24 | .... | .... |
| 18. | 0·173 | 0·000 | 0·086 | .... | .... |

*Remarks.*—No screen analyses were made as the sample was from too near the surface.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | This coal was washed on a small scale only. | | | | | |
| 20. | Washed coal.... | | | | | | |
| 21. | Refuse—coarse.. | | | | | | |
| 22. | Hutch product.. | | | | | | |
| 23. | Jig slimes...... | | | | | | |
| 24. | Table slimes.... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 25. | Original coal .......................wt. in lbs. | .... | % ash | 12·3 | % sulphur | .... |
| 26. | Washed coal...................... " " | .... | " " | 7·9 | " " | .... |
| 27. | Refuse........................... " " | .... | " " | .... | " " | .... |
| 28. | Other products................... " " | .... | " " | .... | " " | .... |
| 29. | Loss............................. " " | .... | " " | .... | " " | .... |
| 30. | Loss in % | | | | | |

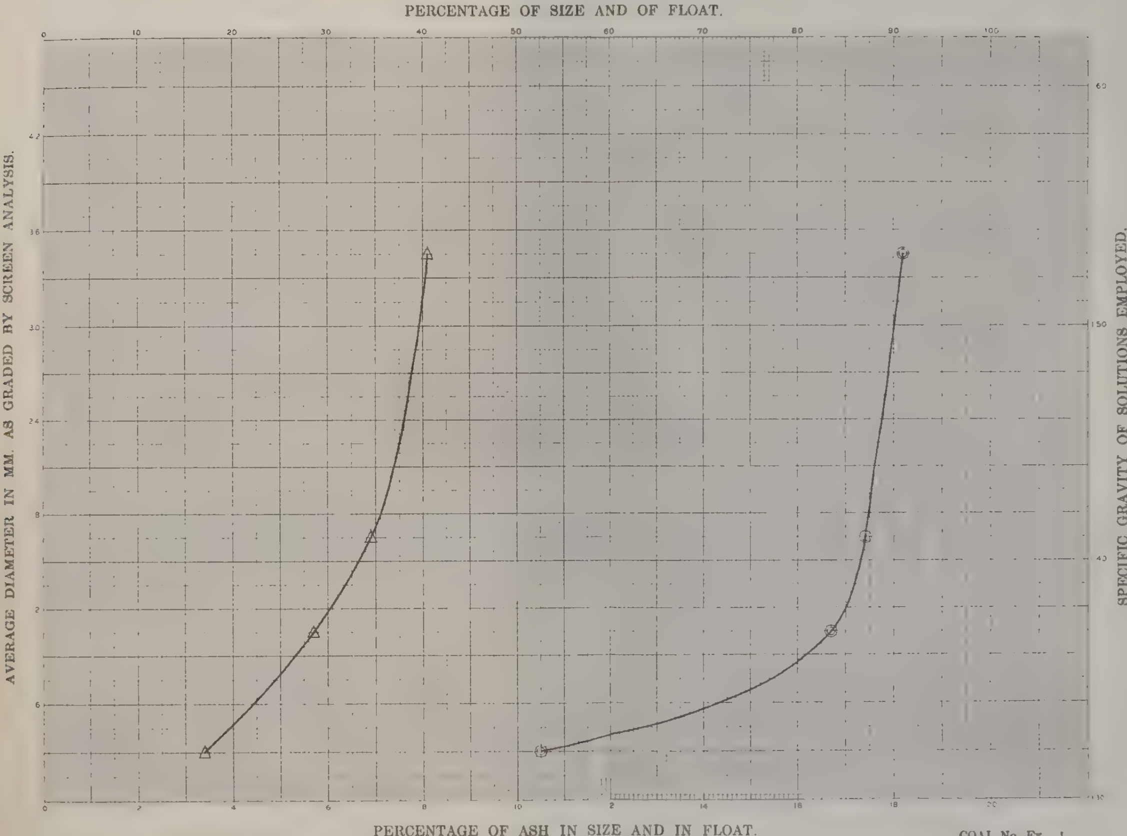
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone....% | 85·0 | Ratio to standard | 92·9 |
| 32. | Reduction in ash..............................% | 35·7 | " " | 103·8 |
| 33. | " " sulphur...................................% | .... | " " | .... |
| 34. | Increase in calorific value—calorimeter ..........% | .... | | |
| 35. | Increase in evaporation under boiler............% | .... | | |
| 36. | Decrease in clinker under boiler................% | .... | | |
| 37. | Fuel ratio of original coal...................... | 1·60 | | |
| 38. | " " washed " ..................... | .... | | |
| 39. | Calorific value of original coal.................. | .... | | |
| 40. | " " washed " ..................... | .... | | |

*Remarks on Tables C, D, and E.*—This trial was made on a small scale, and although the results may be considered satisfactory, better work could undoubtedly be done on a commercial scale.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. Ex. 1
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◙ " " " " " " " material floating at the several densities.

## COAL.—No. EX. 2.

*Locality.*—Granite Creek, Princeton district, B.C.

*Colliery.*—Prospecting tunnel, No. 2.

*Sample.*—This sample, of about 150 pounds, was taken by Dr. Porter in June, 1908, at the face of the tunnel, and correctly represents the workable bench at about 100 feet in from the surface. The coal was, however, slightly weathered and will no doubt improve with depth.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·525 | 89·1 | 8·6 | 10·9 | 55·5 |
| 2. | 1·410 | 82·5 | ... | 17·5 | .... |
| 3. | 1·365 | 75·0 | 5·9 | 25·0 | 38·6 |
| 4. | 1·320 | 36·0 | 3·9 | 64·0 | 19·3 |

The following results are obtained from the above data and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 77·9 | % ash | 6·2 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 12·1 | " " | 24·8 |
| 7. | Useful coal—sum of (5) and (6) | " " | 90·0 | " " | 8·8 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 10·0 | " " | 60·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 14·0 |
| 10. | " " " " " " | | | % sulphur | 1·9 |
| 11. | " " " " " " | | | Fuel Ratio | 1·65 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—The innate ash is a little high. The bone and refuse are moderately low in quantity but high in ash. The coal will wash well, but the standard of 1·55 specific gravity for refuse is probably high in view of the large amount of ash in the bone.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | .... |
| 14. | 3·16 | 1·20 | 2·18 | .... | .... |
| 15. | 1·20 | 0·64 | 0·92 | .... | .... |
| 16. | 0·64 | 0·30 | 0·47 | .... | .... |
| 17. | 0·30 | 0·173 | 0·24 | .... | .... |
| 18. | 0·173 | 0·000 | 0·086 | .... | .... |

*Remarks.*—No screen analyses were made on this coal.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | .... | .... | .... | .... | .... | .... |
| 20. | Washed coal.... | .... | .... | .... | .... | .... | .... |
| 21. | Refuse—coarse.. | .... | .... | .... | .... | .... | .... |
| 22. | Hutch product.. | .... | .... | .... | .... | .... | .... |
| 23. | Jig slimes. ..... | .... | .... | .... | .... | .... | .... |
| 24. | Table slimes.... | .... | .... | .... | .... | .... | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal........................ | wt. in lbs. | .... | % ash | 14·0 | % sulphur | 1·9 |
| 26. | Washed coal........................ | " " | .... | " " | 10·4 | " " | 1·8 |
| 27. | Refuse............................ | " " | .... | " " | .... | " " | .... |
| 28. | Other products..................... | " " | .... | " " | .... | " " | .... |
| 29. | Loss.............................. | " " | .... | " " | .... | " " | .... |
| 30. | Loss in % | | | | | | |

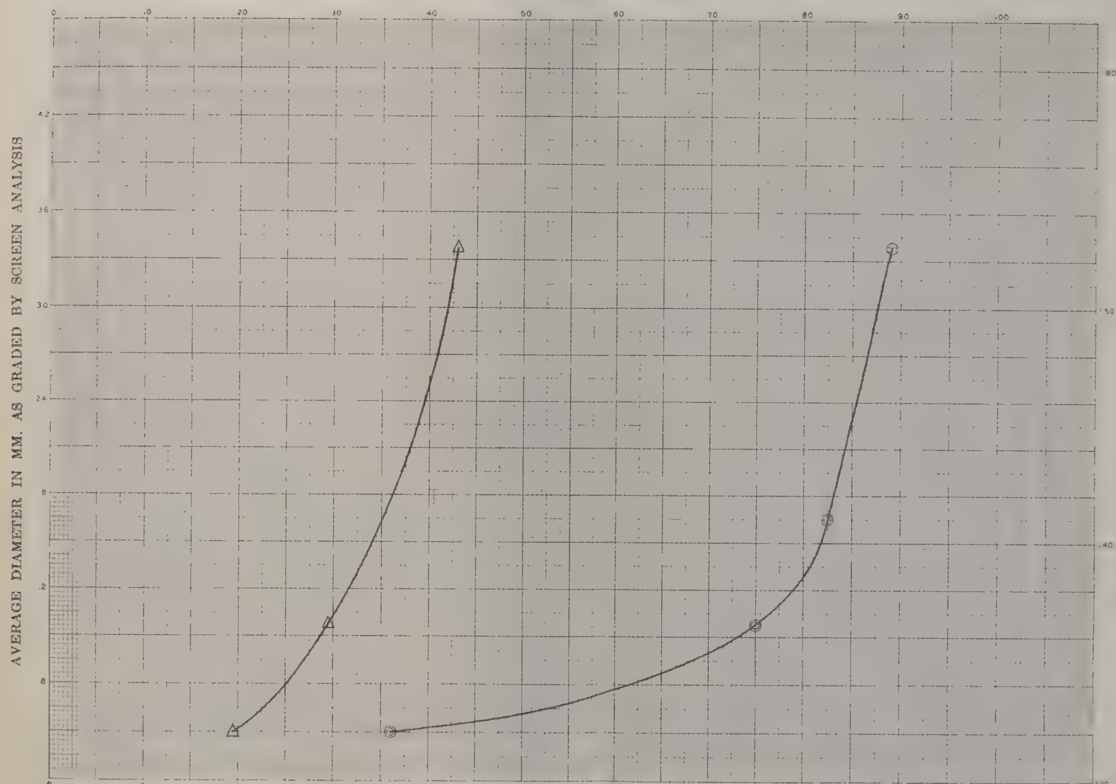
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. . % | 90·0 | Ratio to standard | 100·0 |
| 32. | Reduction in ash............................% | 25·7 | " " | 84·6 |
| 33. | " " sulphur.........................% | 5·3 | " " | .... |
| 34. | Increase in calorific value—calorimeter .........% | .... | | |
| 35. | Increase in evaporation under boiler............% | .... | | |
| 36. | Decrease in clinker under boiler................% | .... | | |
| 37. | Fuel ratio of original coal........................ | 1·65 | | |
| 38. | " " washed " ..................... | | | |
| 39. | Calorific value of original coal.................. | .... | | |
| 40 | " " washed " ................. | .... | | |

*Remarks on Tables C, D, and E.*—This trial was made on a small scale, and while it proved satisfactory it is probable that better results could be obtained in practice, especially if a somewhat larger quantity of refuse were made.

GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. Ex. 2
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
⊙ " " " " " " " material floating at the several densities.

## COAL.—No. EX. 3.

*Locality.*—Granite Creek, Princeton district, B.C.

*Colliery.*—Prospecting tunnel, No. 4.

*Sample.*—This sample, of about 150 pounds, was taken by Dr. Porter in June, 1908, at the face of the tunnel about 150 feet from the surface. The coal was not free from signs of weathering, and it is probable that it would be found to improve considerably with depth.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·525 | 87·0 | 11·4 | 13·0 | 51·0 |
| 2. | 1·400 | 73·4 | 9·7 | 26·6 | 36·4 |
| 3. | 1·365 | 61·1 | 6·6 | 38·9 | 30·6 |
| 4. | 1·320 | 37·0 | 3·7 | 63·0 | 24·4 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 65·0 | % ash | 7·3 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 23·0 | " " | 23·6 |
| 7. | Useful coal—sum of (5) and (6) | " " | 88·0 | " " | 11·6 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 12·0 | " " | 57·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 16·6 |
| 10. | " " " " " " | | | % sulphur | .... |
| 11. | " " " " " " | | | Fuel Ratio | 1·62 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—The innate ash is high and the bone and refuse are higher than in the other samples from the property, but these differences are due in part at least to the fact that the coal was more weathered. In spite of this the refuse is low in quantity as compared with the average of western coals. The ash in both refuse and bone is high, and the coal would wash well, especially if a lower specific gravity standard than 1·55 were taken for the line of demarcation between useful bone and refuse.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | .... |
| 14. | 3·16 | 1·20 | 2·18 | .... | .... |
| 15. | 1·20 | 0·64 | 0·92 | .... | .... |
| 16. | 0·64 | 0·30 | 0·47 | .... | .... |
| 17. | 0·30 | 0·173 | 0·24 | .... | .... |
| 18. | 0·173 | 0·000 | 0·086 | .... | .... |

*Remarks.*—No screen analyses were made on this sample.

TABLE C.

## Results of Washing (Details of Sizes.)

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | .... | .... | .... | .... | .... | .... |
| 20. | Washed coal.... | .... | .... | .... | .... | .... | .... |
| 21. | Refuse—coarse.. | .... | .... | .... | .... | .... | .... |
| 22. | Hutch product.. | .... | .... | .... | .... | .... | .... |
| 23. | Jig slimes. ..... | .... | .... | .... | .... | .... | .... |
| 24. | Table slimes.... | .... | .... | .... | .... | .... | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal ........................ | wt. in lbs. | .... | % ash | 16·6 | % sulphur | .... |
| 26. | Washed coal........................ | " " | .... | " " | 13·9 | " " | .... |
| 27. | Refuse............................ | " " | .... | " " | .... | " " | .... |
| 28. | Other products.................... | " " | .... | " " | .... | " " | .... |
| 29. | Loss.............................. | " " | .... | " " | .... | " " | .... |
| 30. | Loss in % | | | | | | |

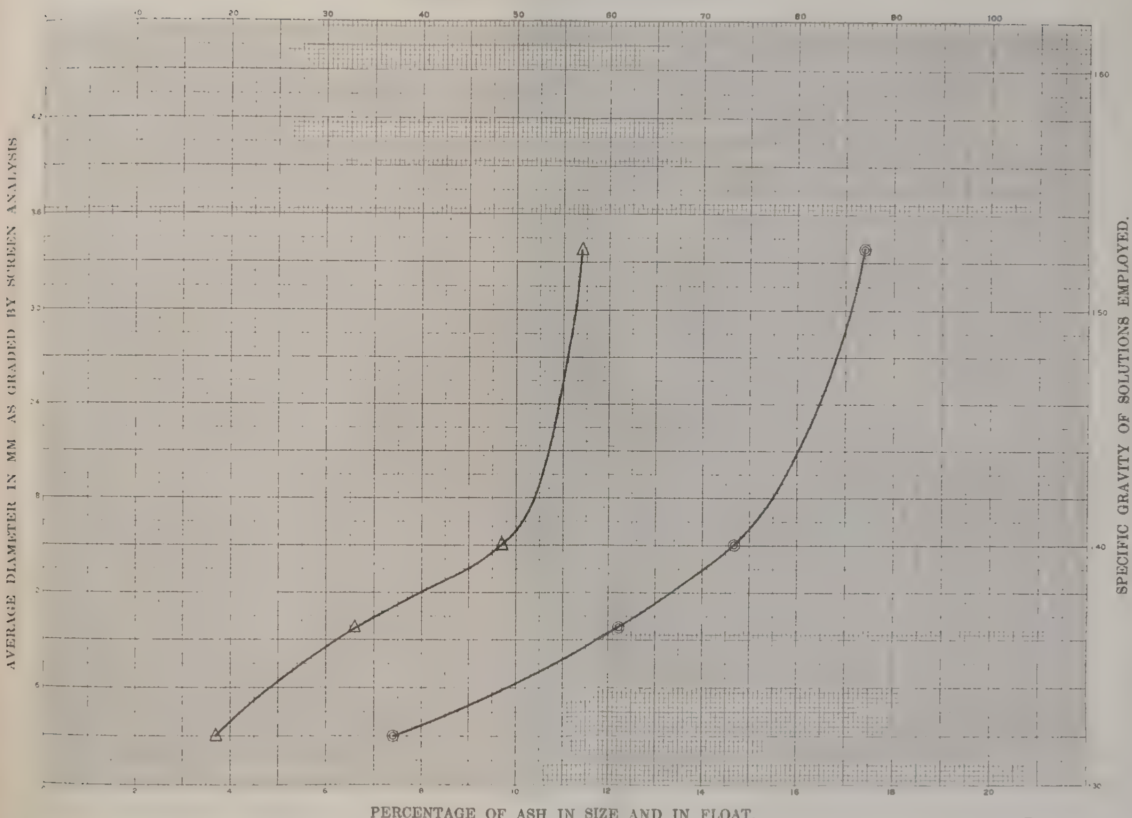
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | | |
|---|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone ... % | 90·0 | Ratio to standard | 102·2 |
| 32. | Reduction in ash.............................% | 13·2 | " " | 83·4 |
| 33. | " " sulphur.........................% | .... | " " | .... |
| 34. | Increase in calorific value—calorimeter..........% | .... | | |
| 35. | Increase in evaporation under boiler.............% | .... | | |
| 36. | Decrease in clinker under boiler.................% | .... | | |
| 37. | Fuel ratio of original coal...................... | 1·62 | | |
| 38. | " " washed " ..................... | .... | | |
| 39. | Calorific value of original coal.................. | .... | | |
| 40. | " " washed " ................ | .... | | |

*Remarks on Tables C, D, and E.*—This trial was made on a very small scale, and while it gave satisfactory results, it is probable that better work could be done on a commercial scale. This is especially true as the sample was from near the surface, and probably more friable and dirty than it should be. The standard for separating bone and refuse is also a little too high for this coal.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. Ex. 3
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities

# NICOLA VALLEY FIELD.

## ERRATUM

On the curve diagrams accompanying the tabulated records of each of the coals tested, is the following legend:—

LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

The above legend is incorrect; in each case it should read thus:—

○ Curve showing the relative quantities of the several sizes.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " material floating at the several densities.
△ " " " " " ash in " " " " " "

## COAL.—No. 22 M.

*Locality.*—Coutlee, Nicola, B.C.

*Colliery.*—Nicola Valley Coal and Coke Co., Middlesboro colliery, Nos. 1 and 2 mines.

*Sample.*—The main sample was taken from No. 1 colliery, and the smaller sample from No. 2. These were accidentally mixed, but as the quantity of No. 2 was very small and its quality very much the same as No. 1, it was not considered necessary to resample.

No. 1 mine: one hundred and forty bags taken from the Jewel seam, near Coal gully. The sample represents a good average of the workings, which were in the development stage, the main tunnel being only 1,250 feet long. The sample was taken from a lot of 600 tons of freshly mined coal.

No. 2 mine: ten sacks from the deeper workings of No. 2 mine, in Rat Hole seam, on Coldwater hill. Sampled April 18, 1908.

TABLE A.

**Specific Gravity Tests.**

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·51.............. | 88·4 | 8·6 | 11·6 | 52·2 |
| 2. | 1·43.............. | 80·3 | 6·7 | 19·7 | 46·3 |
| 3. | 1·37.............. | 73·5 | 6·1 | 26·5 | 36·8 |
| 4. | 1·34.............. | 65·0 | 4·8 | 35·0 | 33·8 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375........................ | % yield | 74·5 | % ash | 6·1 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 ...................... | " " | 16·5 | " " | 23·6 |
| 7. | Useful coal—sum of (5) and (6)........................ | " " | 91·0 | " " | 9·2 |
| 8. | Refuse, Sp. Gr. over 1·55.......................... | " " | 9·0 | " " | 61·0 |
| 9. | Assay of original sample raw coal as sent to chemist.............. | | | " " | 14·1 |
| 10. | " " " " " " .............. | | | % sulphur | 0·9 |
| 11. | " " " " " " .............. | | | Fuel Ratio | 1·20 |
| 12. | Assay of mixed good and bone coal (5) and (6).................... | | | " " | 1·25 |

*Remarks.*—This coal is high in innate ash, and contains a medium amount of bone coal high in ash, and also a medium amount of refuse high in ash. It is only moderately well suited to washing, on account of the high innate ash.

TABLE B.

**Screen Analysis.**

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 72·0 | 12·1 |
| 14. | 3·16 | 1·20 | 2·18 | 11·2 | 12·9 |
| 15. | 1·20 | 0·64 | 0·92 | 6·9 | 12·4 |
| 16. | 0·64 | 0·30 | 0·47 | 3·6 | 12·6 |
| 17. | 0·30 | 0·173 | 0·24 | 3·1 | 14·0 |
| 18. | 0·173 | 0·000 | 0·086 | 3·2 | 16·5 |

*Remarks.*—This coal shows remarkably low friability, at least so far as the production of dust is concerned, although, apparently, it is not par-

ticularly strong in the larger lumps. In appearance, it is very pitchy looking, and it contains a considerable quantity of yellow resin. The refuse is more friable than the coal, which, on the whole, stands shipment and crushing very well.

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal | 3635 | 13·4 | 1702 | 13·4 | 498 | 15·3 |
| 20. Washed coal | 3201 | 9·5 | 1426 | 9·3 | 445 | 11·3 |
| 21. Refuse—coarse | 361 | 48·0 | 156 | 36·3 | 36 | 63·9 |
| 22. Hutch product | 69 | 43·7 | 105 | .... | .... | .... |
| 23. Jig slimes | .... | .... | 12 | 27·5 | .... | .... |
| 24. Table slimes | .... | .... | .... | .... | 13 | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. Original coal | wt. in lbs. | 5835 | % ash | 14·1 | % sulphur | 0·9 |
| 26. Washed coal | " " | 5072 | " " | 10·0 | " " | 0·9 |
| 27. Refuse | " " | 553 | " " | 45·8 | " " | .... |
| 28. Other products | " " | 199 | " " | .... | " " | .... |
| 29. Loss | " " | 11 | " " | .... | " " | .... |
| 30. Loss in % 0·2. | | | | | | |

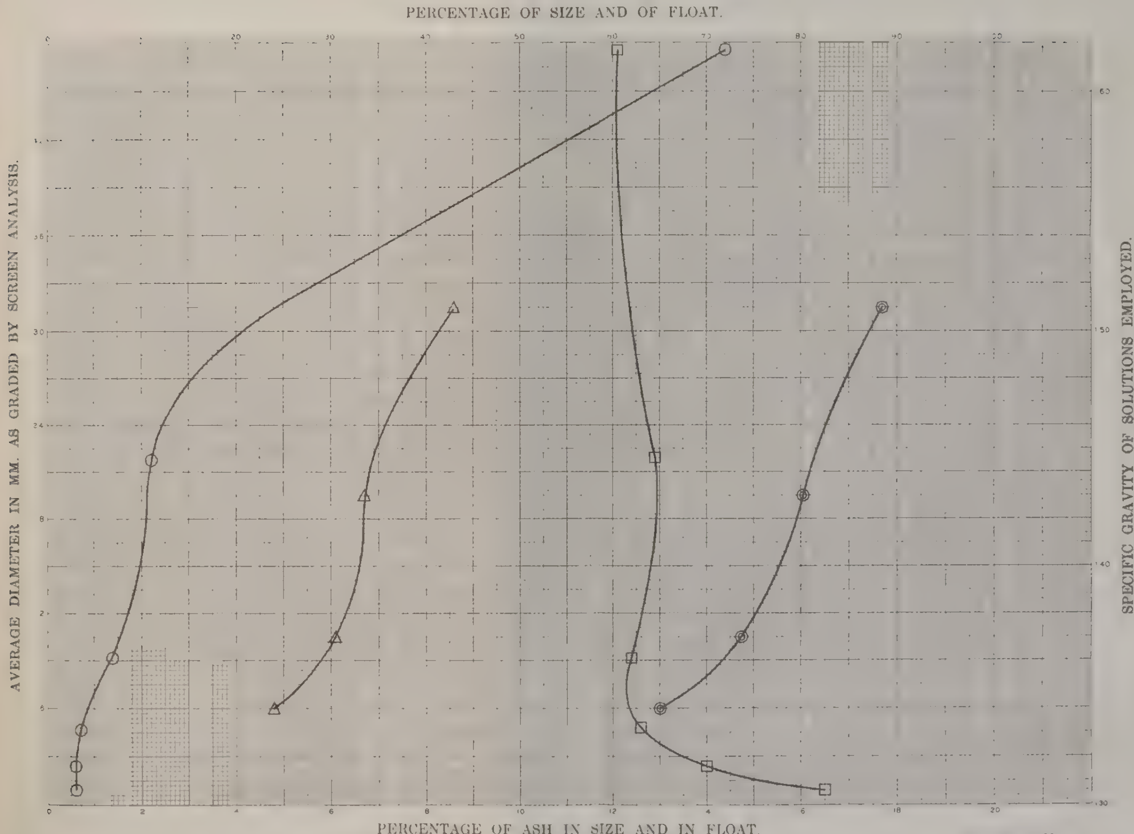
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone | % | 87·0 | Ratio to standard | 95·7 |
| 32. Reduction in ash | % | 29·1 | " " | 92·0 |
| 33. " " sulphur | % | 0·0 | " " | .... |
| 34. Increase in calorific value—calorimeter | % | 7·7 | | |
| 35. Increase in evaporation under boiler | % | 2·3 | | |
| 36. Decrease in clinker under boiler | % | 25·9 | | |
| 37. Fuel ratio of original coal | | 1·20 | | |
| 38. " " washed " | | 1·26 | | |
| 39. Calorific value of original coal | | 6510 | | |
| 40 " " washed " | | 7010 | | |

*Remarks on Tables C, D, and E.*—The trial was fairly successful, the reduction in ash and the recovery of washed coal being nearly as good as could have been expected from the preliminary tests. It is possible, however, that better work, particularly on the fine coal, could be done in a commercial plant.

GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ **Curve showing the** relative quantities of the several sizes
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities

COAL No 22M
APPENDIX I, VOL III

# WHITEHORSE COAL FIELD, Y.T.

## ERRATUM

On the curve diagrams accompanying the tabulated records of each of the coals tested, is the following legend:—

### LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

The above legend is incorrect; in each case it should read thus:—

○ Curve showing the relative quantities of the several sizes.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " material floating at the several densities.
△ " " " " " ash in " " " " "

## COAL.—No. EX. 31.

*Locality.*—Whitehorse, Yukon Territory.

*Colliery.*—Whitehorse Pass and Yukon Railway Co., Tantalus mine.

*Sample.*—Four sacks from the upper seam of the Tantalus mine, all bone, slate, and rock over ½″ having been removed by hand picking. This and samples Exs. 32 and 33 were taken by a member of the permanent staff of the Geological Survey. The conditions of transportation precluded shipping larger samples to Montreal.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·530 | 75·0 | 9·2 | 25·0 | .... |
| 2. | 1·410 | 53·0 | 5·7 | 46·1 | 30·0 |
| 3. | 1·375 | 37·9 | 4·5 | 62·1 | 24·5 |
| 4. | 1·325 | 14·5 | 2·7 | 85·5 | 19·7 |

The following results are obtained from the above data, and from the chemists results.

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 38·0 | % ash | 4·5 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 40·0 | " " | 14·2 |
| 7. | Useful coal—sum of (5) and (6) | " " | 78·0 | " " | 9·5 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 22·0 | " " | 43·5 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 17·0 |
| 10. | " " " " " " | | | % sulphur | 0·5 |
| 11. | " " " " " " | | | Fuel Ratio | 2·32 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—The coal contains moderate proportions of innate ash, and large proportions of bone and refuse, both low in ash. The amount of total ash in the refuse is considerable, but the loss in washing would be large, on account of the low ash contained in the material to be removed.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | .... |
| 14. | 3·16 | 1·20 | 2·18 | .... | .... |
| 15. | 1·20 | 0·64 | 0·92 | .... | .... |
| 16. | 0·64 | 0·30 | 0·47 | .... | .... |
| 17. | 0·30 | 0·173 | 0·24 | .... | .... |
| 18. | 0·173 | 0·000 | 0·806 | .... | .... |

*Remarks.*—No screen analysis was made of these samples.

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal | This sample was washed on a small scale only. | | | | | |
| 20. Washed coal | | | | | | |
| 21. Refuse—coarse | | | | | | |
| 22. Hutch product | | | | | | |
| 23. Jig slimes | | | | | | |
| 24. Table slimes | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. Original coal | wt. in lbs. | 115 | % ash | 17·0 | % sulphur | 0·5 |
| 26. Washed coal | " " | 93 | " " | 13·8 | " " | 0·5 |
| 27. Refuse | " " | 17 | " " | 43·5 | " " | .... |
| 28. Other products | " " | ... | " " | .... | " " | .... |
| 29. Loss | " " | 5·0 | " " | .... | " " | .... |

30. Loss in % 4·3.

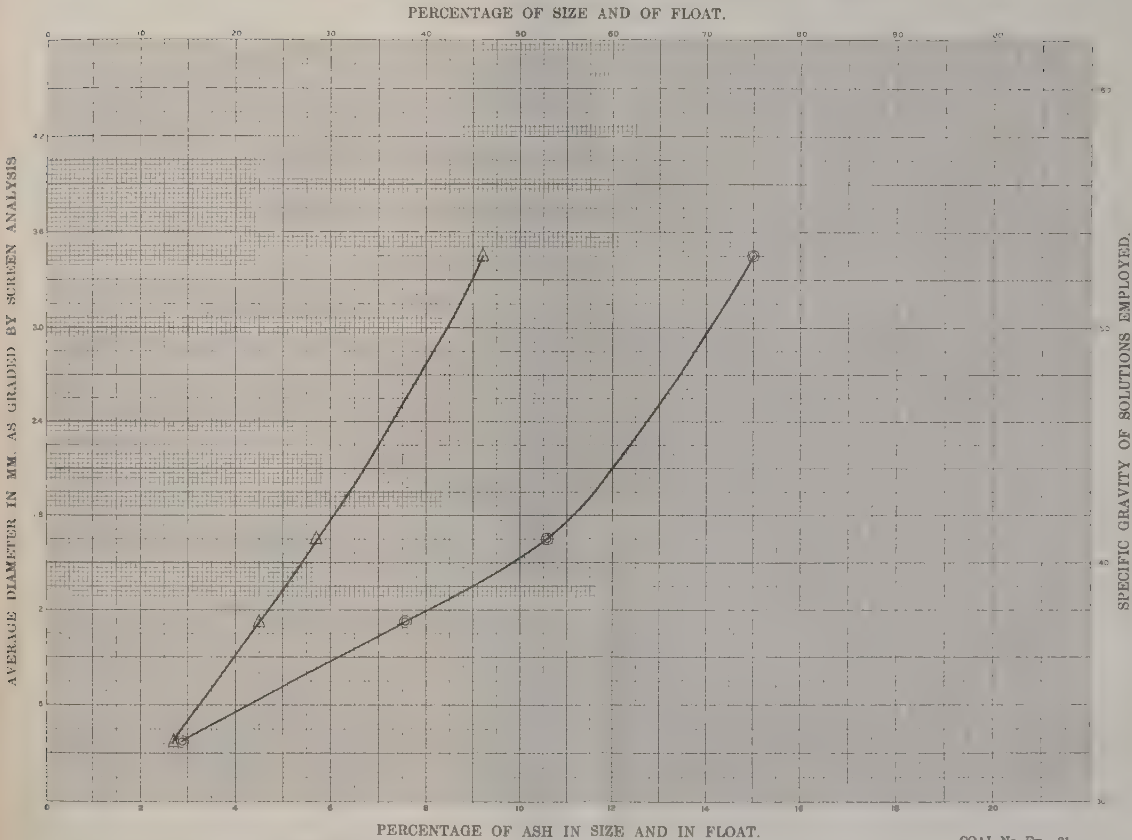
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone | % | 81·0 | Ratio to standard | 103·8 |
| 32. Reduction in ash | % | 18·8 | " " | 68·8 |
| 33. " " sulphur | % | .... | " " | .... |
| 34. Increase in calorific value—calorimeter | % | 6·1 | | |
| 35. Increase in evaporation under boiler | % | .... | | |
| 36. Decrease in clinker under boiler | % | .... | | |
| 37. Fuel ratio of original coal | | 2·32 | | |
| 38. " " washed " | | 2·28 | | |
| 39. Calorific value of original coal | | 6700 | | |
| 40. " " washed " | | 7110 | | |

*Remarks on Tables C, D, and E.*—Owing to the very small size of the sample, it was necessary to wash this coal on a small model washer, and the results were not satisfactory, probably due to the impossibility of skimming the jig beds accurately on so small a scale. As a result, the ash, particularly in the coal between ⅜″ and $\frac{3}{32}$″, is too high and the total recovery is too great. A much better result could, unquestionably, be obtained in a commercial washer, although, even at best, the coal is not easy to deal with.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. Ex. 31
Appendix I, Vol. III

## COAL.—No. EX. 32.

*Locality.*—Whitehorse, Yukon Territory.

*Colliery.*—Whitehorse Pass and Yukon Railway Co., Tantalus mine.

*Sample.*—Four sacks from the middle seam of the Tantalus mine, all bone, slate, and rock over ½″ having been removed by hand picking. This and samples Exs. 31 and 33 were taken by a member of the permanent staff of the Geological Survey. The conditions of transportation precluded shipping a large sample to Montreal.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·545 | 72·4 | 11·6 | 27·6 | 46·4 |
| 2. | 1·415 | 38·0 | 7·1 | 62·0 | 30·0 |
| 3. | 1·375 | 23·1 | 5·2 | 76·9 | 27·0 |
| 4. | 1·325 | 5·1 | 2·5 | 94·9 | 22·6 |

The following results are obtained from the above data, and from the chemists results.

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 23·0 | % ash | 5·2 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 50·5 | " " | 14·7 |
| 7. | Useful coal—sum of (5) and (6) | " " | 73·5 | " " | 11·7 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 26·5 | " " | 46·8 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 19·2 |
| 10. | " " " " " " | | | % sulphur | 0·5 |
| 11. | " " " " " " | | | Fuel Ratio | 2·03 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—This coal has a high innate ash, and very large proportions of bone coal and refuse, low in ash. It can be easily washed to about 15 per cent and perhaps with advantage to 11 per cent : below this, the loss would probably be excessive.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | ... |
| 14. | 3·16 | 1·20 | 2·18 | .... | ... |
| 15. | 1·20 | 0·64 | 0·92 | .... | ... |
| 16. | 0·64 | 0·30 | 0·47 | .... | ... |
| 17. | 0·30 | 0·173 | 0·24 | .... | ... |
| 18. | 0·173 | 0·000 | 0·086 | .... | ... |

*Remarks.*—No screen analysis was made of this coal.

TABLE C.

## Results of Washing (Details of Sizes.)

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal | This coal was washed on a very small scale only. | | | | | |
| 20. Washed coal | | | | | | |
| 21. Refuse—coarse | | | | | | |
| 22. Hutch product | | | | | | |
| 23. Jig slimes | | | | | | |
| 24. Table slimes | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | |
|---|---|---|---|---|
| 25. Original coal | wt. in lbs. 149 | % ash 19·2 | % sulphur 0·5 |
| 26. Washed coal | " " 114 | " " 14·0 | " " 0·4 |
| 27. Refuse | " " 32 | " " 45·8 | " " .... |
| 28. Other products | " " .. | " " .... | " " .... |
| 29. Loss | " " 3 | " " .... | " " .... |
| 30. Loss in % 2·0. | | | |

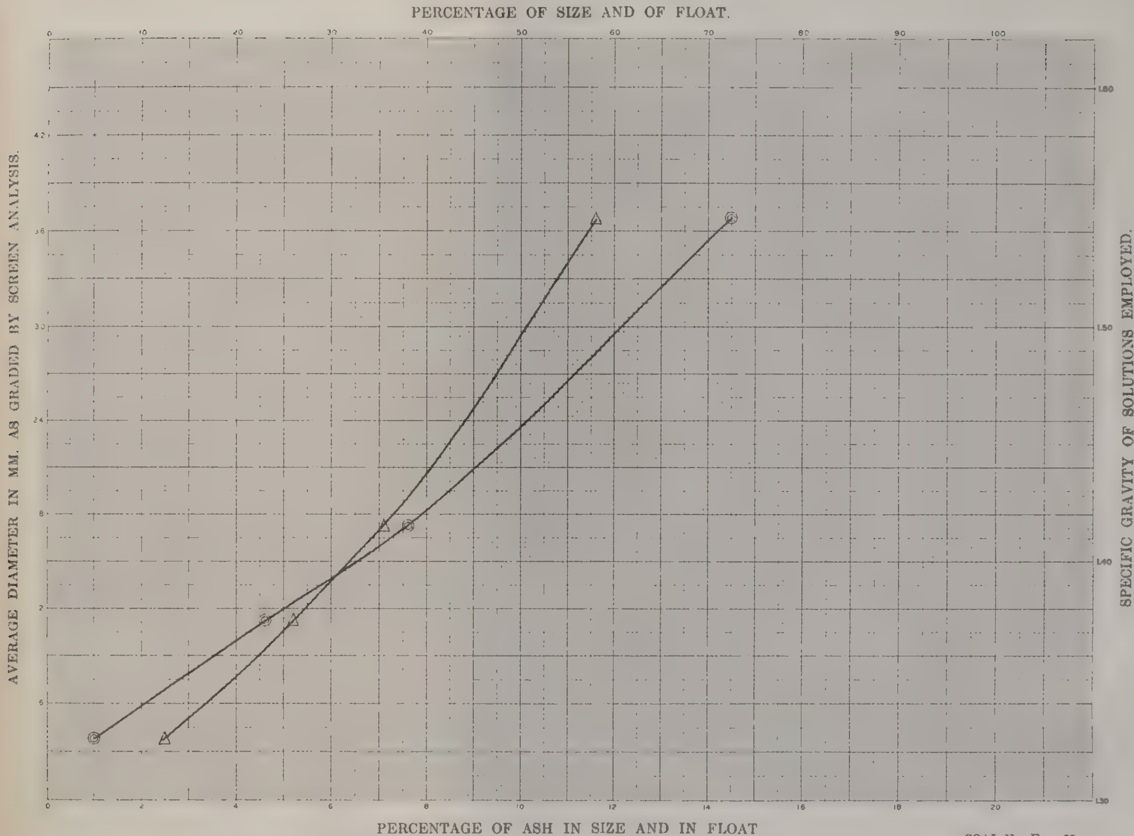
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | |
|---|---|---|---|
| 31. Recovery of washed coal, including good bone. . % | 76·5 | Ratio to standard | 104·0 |
| 32. Reduction in ash % | 27·1 | " " | 83·5 |
| 33. " " sulphur % | 20·0 | " " | .... |
| 34. Increase in calorific value—calorimeter % | 12·0 | | |
| 35. Increase in evaporation under boiler % | .... | | |
| 36. Decrease in clinker under boiler % | .... | | |
| 37. Fuel ratio of original coal | 2·03 | | |
| 38. " " washed " | 2·35 | | |
| 39. Calorific value of original coal | 6310 | | |
| 40 " " washed " | 7070 | | |

*Remarks on Tables C, D, and E.*—This trial was more satisfactory than that of the Upper seam, Ex. 31, and, on the whole, was as good as can be expected from so small a quantity of material.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. Ex. 32
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
⊏ " " " percentage of ash in each of the several sizes.
⊙ " " " " " " " material floating at the several densities.

## COAL.—No. EX. 33.

*Locality.*—Whitehorse, Yukon Territory.

*Colliery.*—Whitehorse Pass and Yukon Railway Co., Tantalus mine.

*Sample.*—Four sacks from the lower seam of the Tantalus mine, all bone, slate, and rock over ½″ having been removed by hand picking. This and samples Exs. 31 and 32 were taken by a member of the permanent staff of the Geological Survey. The conditions of transportation precluded shipping a larger sample to Montreal.

TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·560............. | 78·4 | 8·6 | 21·6 | 40·8 |
| 2. | 1·410............. | 66·0 | 6·5 | 34·0 | 34·6 |
| 3. | 1·375............. | 52·8 | 5·3 | 47·2 | 26·8 |
| 4. | 1·325............. | 29·6 | 3·6 | 70·4 | 20·0 |

The following results are obtained from the above data, and from the chemists results:—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375...................... | % yield | 53·0 | % ash | 5·3 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55.................... | " " | 24·7 | " " | 15·3 |
| 7. | Useful coal—sum of (5) and (6)...................... | " " | 77·7 | " " | 8·5 |
| 8. | Refuse, Sp. Gr. over 1·55........................... | " " | 22·3 | " " | 40·0 |
| 9. | Assay of original sample raw coal as sent to chemist............. | | | " " | 16·2 |
| 10. | " " " " " " .............. | | | % sulphur | 0·5 |
| 11. | " " " " " " .............. | | | Fuel Ratio | 2·02 |
| 12. | Assay of mixed good and bone coal (5) and (6).................. | | | " " | .... |

*Remarks.*—This seam has a larger proportion of good coal and less bone than the other seams tested. The refuse, also, is low in ash. It could be improved by washing, but not to a very great extent without heavy loss.

TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample. | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | .... |
| 14. | 3·16 | 1·20 | 2·18 | .... | .... |
| 15. | 1·20 | 0·64 | 0·92 | .... | .... |
| 16. | 0·64 | 0·30 | 0·47 | .... | .... |
| 17. | 0·30 | 0·173 | 0·24 | .... | .... |
| 18. | 0·173 | 0·000 | 0·086 | .... | .... |

*Remarks.*—No screen analysis was made of this coal.

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|
| 19. Original coal | This sample was washed on a very small scale. | | | | | |
| 20. Washed coal | | | | | | |
| 21. Refuse—coarse | | | | | | |
| 22. Hutch product | | | | | | |
| 23. Jig slimes | | | | | | |
| 24. Table slimes | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 25. Original coal | wt. in lbs. | 154 | % ash | 16·2 | % sulphur | 0·5 |
| 26. Washed coal | " " | 128 | " " | 12·7 | " " | 0·5 |
| 27. Refuse | " " | 21 | " " | 50·1 | " " | .... |
| 28. Other products | " " | .. | " " | .... | " " | .... |
| 29. Loss | " " | 5 | " " | .... | " " | .... |

30. Loss in % 3·2.

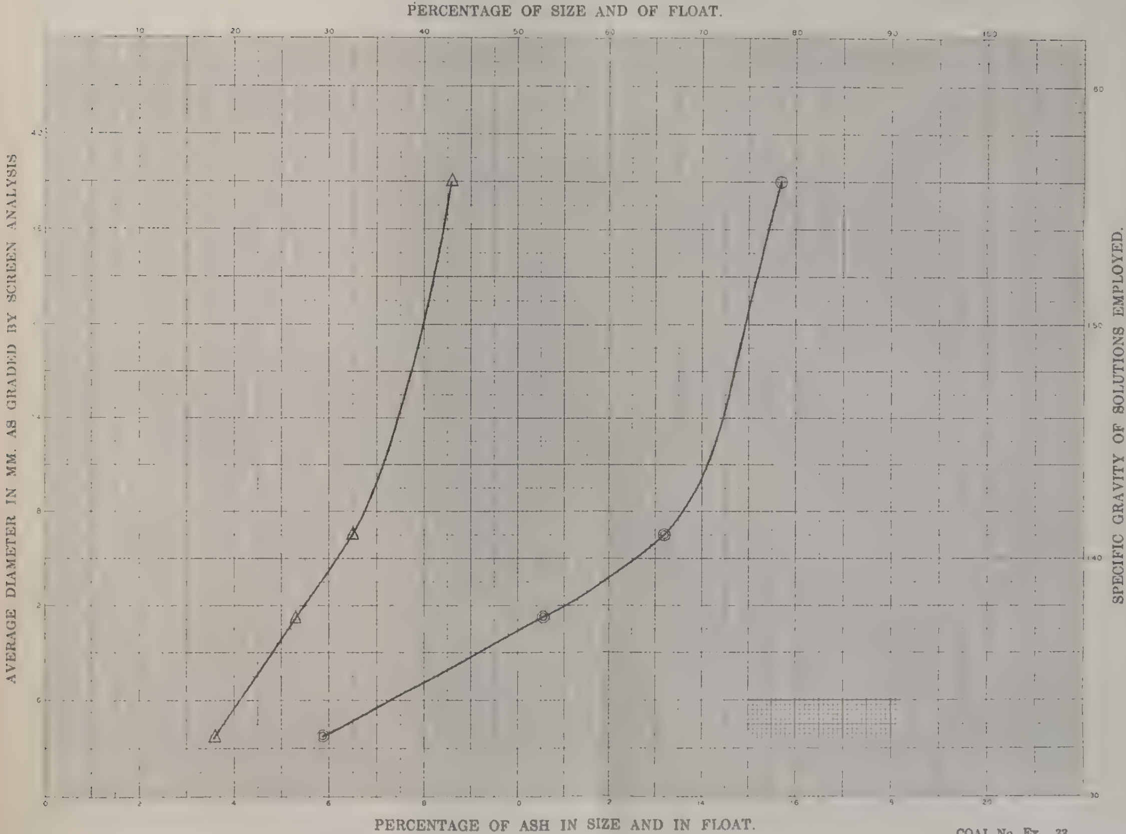
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone | % | 83·0 | Ratio to standard | 106·8 |
| 32. Reduction in ash | % | 21·6 | " " | 66·9 |
| 33. " " sulphur | % | 0·0 | " " | .... |
| 34. Increase in calorific value—calorimeter | % | 6·2 | | |
| 35. Increase in evaporation under boiler | % | ... | | |
| 36. Decrease in clinker under boiler | % | ... | | |
| 37. Fuel ratio of original coal | | 2·02 | | |
| 38. " " washed " | | 2·11 | | |
| 39. Calorific value of original coal | | 6790 | | |
| 40. " " washed " | | 7210 | | |

*Remarks on Tables C, D, and E.*—This trial was not satisfactory, owing to conditions already explained under Ex. 31. If the quantity had been sufficient for a repetition, it would have been possible to get better results by wasting a little more refuse. In practice this, unquestionably, would be done.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. Ex. 33
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

# VANCOUVER ISLAND.

## SOUTHERN COAL FIELD.

### ERRATUM

On the curve diagrams accompanying the tabulated records of each of the coals tested, is the following legend:—

LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.<br>
△ " " " " " " " " densities.<br>
□ " " " percentage of ash in each of the several sizes.<br>
◎ " " " " " " " material floating at the several densities.

The above legend is incorrect; in each case it should read thus:—

○ Curve showing the relative quantities of the several sizes.<br>
□ " " " percentage of ash in each of the several sizes.<br>
◎ " " " " " material floating at the several densities.<br>
△ " " " " " ash in " " " " " "

## COAL.—No. 20.

*Locality.*—Extension, Vancouver island, B.C.

*Colliery.*—Wellington Colliery Co., Extension mine.

*Sample.*—One hundred and twenty-eight bags, weighing 10 tons, from the Wellington seam, the thickness of which varies from 4 to 14 feet. The sample was taken when numerous sections of the mine were being operated. The working extends 2½ miles east and west of the main tunnel, which, itself, is one mile long. The sample is of lump coal, which had passed over a 1½″ screen, and had been hand picked by Chinese labourers. Sampled April 8, 1908.

TABLE A.

**Specific Gravity Tests.**

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·520 | 91·5 | 6·5 | 8·5 | 43·2 |
| 2. | 1·430 | 89·8 | 6·0 | 10·2 | .... |
| 3. | 1·370 | 85·5 | 5·4 | 14·7 | 34·5 |
| 4. | 1·340 | 80·0 | 5·0 | 20·0 | 27·5 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 86·0 | % ash | 5·5 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 6·0 | " " | 22·7 |
| 7. | Useful coal—sum of (5) and (6) | " " | 92·0 | " " | 6·5 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 8·0 | " " | 45·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 10·1 |
| 10. | " " " " " " | | | % sulphur | 0·4 |
| 11. | " " " " " " | | | Fuel Ratio | 1·24 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 1·33 |

*Remarks.*—This coal could be appreciably improved by washing, but it is good enough for ordinary use as fuel without it, and the improvement due to washing would probably not justify treatment. It is probable, however, that it will ultimately pay to wash the screenings, which carry more ash than the lump coal.

TABLE B.

**Screen Analysis.**

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 42·8 | 9·8 |
| 14. | 3·16 | 1·20 | 2·18 | 23·7 | 8·5 |
| 15. | 1·20 | 0·64 | 0·92 | 13·7 | 8·4 |
| 16. | 0·64 | 0·30 | 0·47 | 7·5 | 9·0 |
| 17. | 0·30 | 0·173 | 0·24 | 6·2 | 9·5 |
| 18. | 0·173 | 0·000 | 0·086 | 6·1 | 12·5 |

*Remarks.*—This coal is weaker than the Nanaimo coal, Nos. 17 and 18, and the ash-bearing material is also weaker. The coal is not, however, really friable, and it stands shipment and crushing fairly well, making only a medium proportion of fines.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal . . . | This coal was not washed. | | | | | |
| 20. | Washed coal. . . . | | | | | | |
| 21. | Refuse—coarse. . | | | | | | |
| 22. | Hutch product. . | | | | | | |
| 23. | Jig slimes. . . . . . | | | | | | |
| 24. | Table slimes. . . . | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25. | Original coal . . . . . . . . . . . . . . . . . . . . . . . | wt. in lbs. | . . . . | % ash | . . . . | % sulphur | . . . . |
| 26. | Washed coal. . . . . . . . . . . . . . . . . . . . . . . . | " " | . . . . | " " | . . . . | " " | . . . . |
| 27. | Refuse. . . . . . . . . . . . . . . . . . . . . . . . . . . . | " " | . . . . | " " | . . . . | " " | . . . . |
| 28. | Other products. . . . . . . . . . . . . . . . . . . . . . | " " | . . . . | " " | . . . . | " " | . . . . |
| 29. | Loss. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | " " | . . . . | " " | . . . . | " " | . . . . |
| 30. | Loss in % | | . . . . | | . . . . | | . . . . |

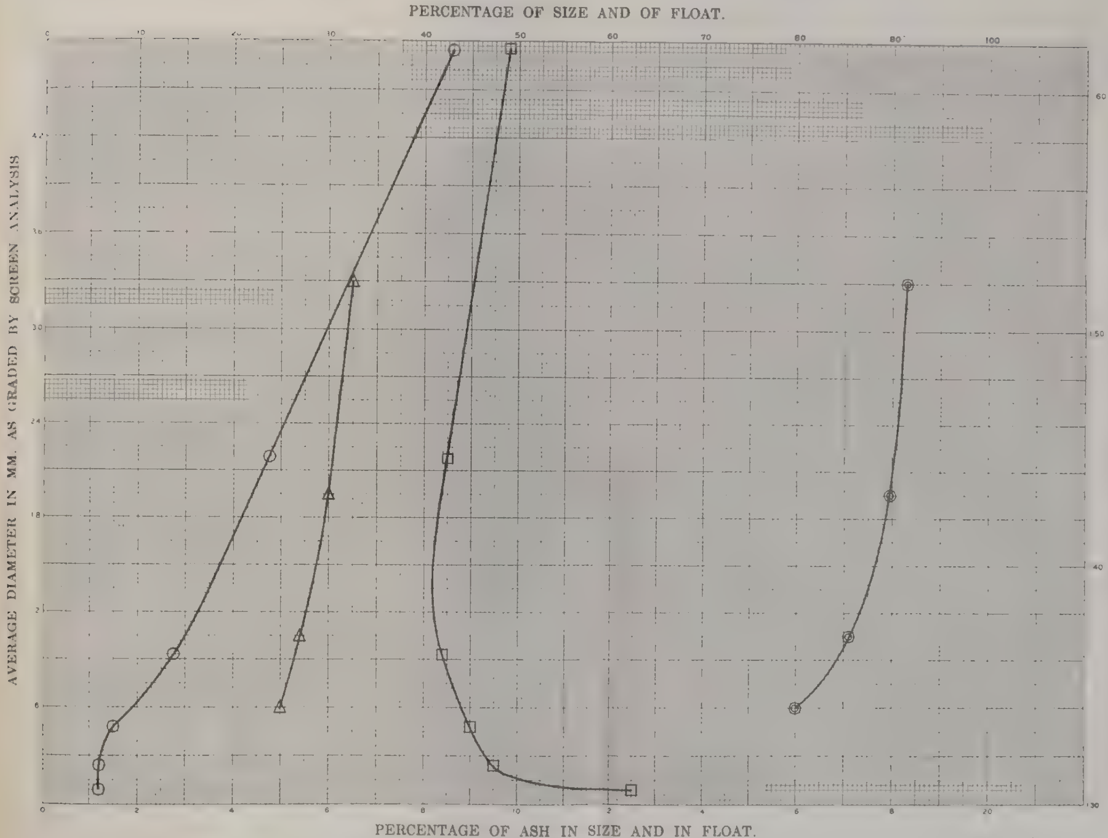
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | | |
|---|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. . . . % | . . . . | Ratio to standard | . . . . |
| 32. | Reduction in ash . . . . . . . . . . . . . . . . . . . . . . . . . . . . % | . . . . | " " | . . . . |
| 33. | " " sulphur. . . . . . . . . . . . . . . . . . . . . . . . . % | . . . . | " " | . . . . |
| 34. | Increase in calorific value—calorimeter. . . . . . . . . . % | . . . . | | |
| 35. | Increase in evaporation under boiler. . . . . . . . . . . . % | . . . . | | |
| 36. | Decrease in clinker under boiler. . . . . . . . . . . . . . . . % | . . . . | | |
| 37. | Fuel ratio of original coal. . . . . . . . . . . . . . . . . . . . . | . . . . | | |
| 38. | " " washed " . . . . . . . . . . . . . . . . . . . . | . . . . | | |
| 39. | Calorific value of original coal. . . . . . . . . . . . . . . . . | . . . . | | |
| 40. | " " washed " . . . . . . . . . . . . . . . . . | . . . . | | |

*Remarks on Tables C, D, and E.*—The results of preliminary tests were such that it was not considered necessary to wash this coal.

GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. 20
APPENDIX I, VOL. III

## COAL.—No. 18.

*Locality.*—Nanaimo, Vancouver island, B.C.

*Colliery.*—Western Fuel Company, No. 1 Main slope, upper seam.

*Sample.*—One hundred and forty-five bags from the upper seam, or south side coal, taken from workings on the diagonal slope off No. 1 main shaft. The sample was of lump coal which had passed over a 2″ screen and a hand picking table, with Chinese workmen. Sampled April 4, 1908.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·520............. | 95·2 | 8·0 | 4·8 | 45·9 |
| 2. | 1·410............. | 89·0 | 7·1 | 11·0 | 32·0 |
| 3. | 1·370............. | 86·0 | 6·8 | 14·0 | 26·8 |
| 4. | 1·310............. | 63·8 | 5·4 | 37·2 | 16·8 |

The following results are obtained from the above data and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375........................ | % yield | 86·5 | % ash | 6·8 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55..................... | " " | 10·0 | " " | 20·0 |
| 7. | Useful coal—sum of (5) and (6)....................... | " " | 96·5 | " " | 8·1 |
| 8. | Refuse, Sp. Gr. over 1·55.......................... | " " | 3·5 | " " | 52·5 |
| 9. | Assay of original sample raw coal as sent to chemist.............. | | | " " | 10·3 |
| 10. | " " " " " " .............. | | | % sulphur | 0·9 |
| 11. | " " " " " " .............. | | | Fuel Ratio | 1·18 |
| 12. | Assay of mixed good and bone coal (5) and (6).................. | | | " " | 1·18 |

*Remarks.*—The innate ash in the coal is high. The bone is low in amount and has a medium quantity of ash. The refuse, also, is low in amount, with fairly low ash. The coal, therefore, will not be materially improved by washing.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 3·78 | 70·6 | 10·3 |
| 14. | 3·16 | 1·20 | | | |
| 15. | 1·20 | 0·64 | 0·92 | 9·3 | 9·9 |
| 16. | 0·64 | 0·30 | 0·47 | 6·0 | 10·1 |
| 17. | 0·30 | 0·173 | 0·24 | 7·7 | 10·3 |
| 18. | 0·173 | 0·000 | 0·086 | 4·4 | 13·2 |

*Remarks.*—The screen analysis is very similar to that of the coal from the lower seam, but the ash-bearing material and the coal have nearly the same strength. The coal is by no means friable, and stands shipment and crushing well.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal ... | This coal was not washed. | | | | | |
| 20. | Washed coal.... | | | | | | |
| 21. | Refuse—coarse.. | | | | | | |
| 22. | Hutch product.. | | | | | | |
| 23. | Jig slimes. ..... | | | | | | |
| 24. | Table slimes.... | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | |
|---|---|---|---|---|
| 25. | Original coal........................ | wt. in lbs. .... | % ash .... | % sulphur .... |
| 26. | Washed coal........................ | " " .... | " " .... | " " .... |
| 27. | Refuse.............................. | " " .... | " " .... | " " .... |
| 28. | Other products..................... | " " .... | " " .... | " " .... |
| 29. | Loss................................. | " " .... | " " .... | " " .... |
| 30. | Loss in % | | | |

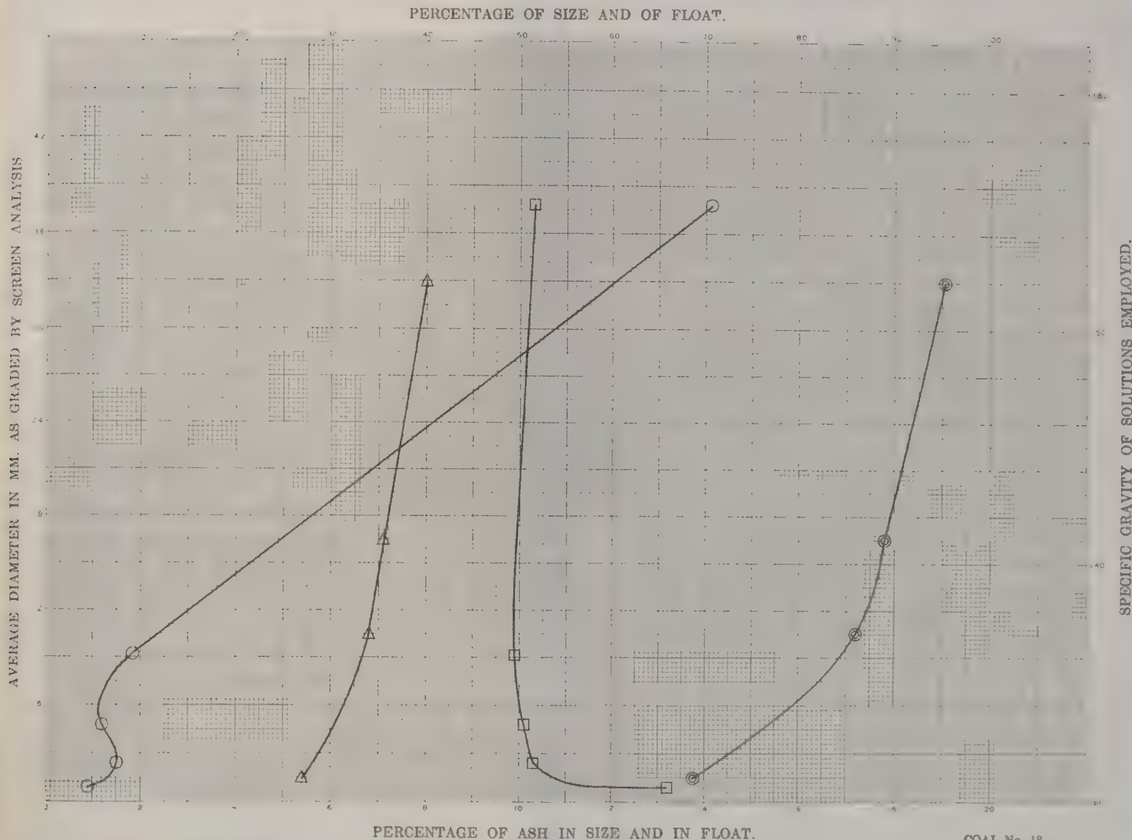
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. . .% | .... | Ratio to standard | .... |
| 32. | Reduction in ash............................% | .... | " " | .... |
| 33. | " " sulphur.........................% | .... | " " | .... |
| 34. | Increase in calorific value—calorimeter .........% | .... | | |
| 35. | Increase in evaporation under boiler............% | .... | | |
| 36. | Decrease in clinker under boiler................% | .... | | |
| 37. | Fuel ratio of original coal...................... | .... | | |
| 38. | " " washed " ...................... | .... | | |
| 39. | Calorific value of original coal.................. | .... | | |
| 40. | " " washed " ................ | .... | | |

*Remarks on Tables C, D, and E.*—The results of the preliminary tests were such that it was not considered necessary to wash this coal.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




COAL No. 18
APPENDIX I, VOL. III

LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

## COAL.—No. 17.

*Locality.*—Nanaimo, Vancouver island, B.C.

*Colliery.*—Western Fuel Company, No. 1, Main lower seam.

*Sample.*—One hundred and thirty-four bags taken from No. 1 North Level working, about 1½ miles from the bottom of No. 1 shaft, about 2,000 feet from Protection Island shaft. The sample was of lump coal, which had passed over a 2″ screen and a hand picking table, with Chinese workmen. Sampled April 6, 1908.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·550 | 95·8 | 9·3 | 4·2 | 59·4 |
| 2. | 1·445 | 93·6 | 9·2 | 6·4 | 39·4 |
| 3. | 1·370 | 84·2 | 8·0 | 15·8 | 27·9 |
| 4. | 1·325 | 57·9 | 7·0 | 42·1 | 16·8 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 84·7 | % ash | 8·1 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 11·1 | " " | 18·6 |
| 7. | Useful coal—sum of (5) and (6) | " " | 95·8 | " " | 9·3 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 4·2 | " " | 59·4 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 11·9 |
| 10. | " " " " " " | | | % sulphur | 1·3 |
| 11. | " " " " " " | | | Fuel Ratio | 1·12 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 1·16 |

*Remarks.*—This coal has an exceptionally high proportion of innate ash, and a rather low proportion of bone of medium quality. The refuse is small, but high in ash, and can easily be removed by washing, but the improvement would scarcely be sufficient to justify the operation under present conditions.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 3·78 | 69·8 | 11·8 |
| 14. | 3·16 | 1·20 | | | |
| 15. | 1·20 | 0·64 | 0·92 | 15·8 | 11·0 |
| 16. | 0·64 | 0·30 | 0·47 | 7·7 | 11·1 |
| 17. | 0·30 | 0·173 | 0·24 | 8·3 | 12.8 |
| 18. | 0·173 | 0·000 | 0·086 | 4·4 | 15·8 |

*Remarks.*—The percentage of very fine coal is small. The ash-bearing material is evidently more friable than the coal, which is hard and stands shipment and fine crushing without producing very much dust.

TABLE C.

## Results of Washing (Details of Sizes).

| Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash %. |
|---|---|---|---|---|---|---|
| 19. Original coal.............. | This coal was not washed. | | | | | |
| 20. Washed coal.............. | | | | | | |
| 21. Refuse—coarse............ | | | | | | |
| 22. Hutch product............ | | | | | | |
| 23. Jig slimes................ | | | | | | |
| 24. Table slimes.............. | | | | | | |

TABLE D.

## Results of Washing (Totals).

| | | | | | | |
|---|---|---|---|---|---|---|
| 25. Original coal ...................... | wt. in lbs. | .... | % ash | .... | % sulphur | .... |
| 26. Washed coal...................... | " " | .... | " " | .... | " " | .... |
| 27. Refuse.......................... | " " | .... | " " | .... | " " | .... |
| 28. Other products.................. | " " | .... | " " | .... | " " | .... |
| 29. Loss.............................. | " " | .... | " " | .... | " " | .... |
| 30. Loss in % | | | | | | |

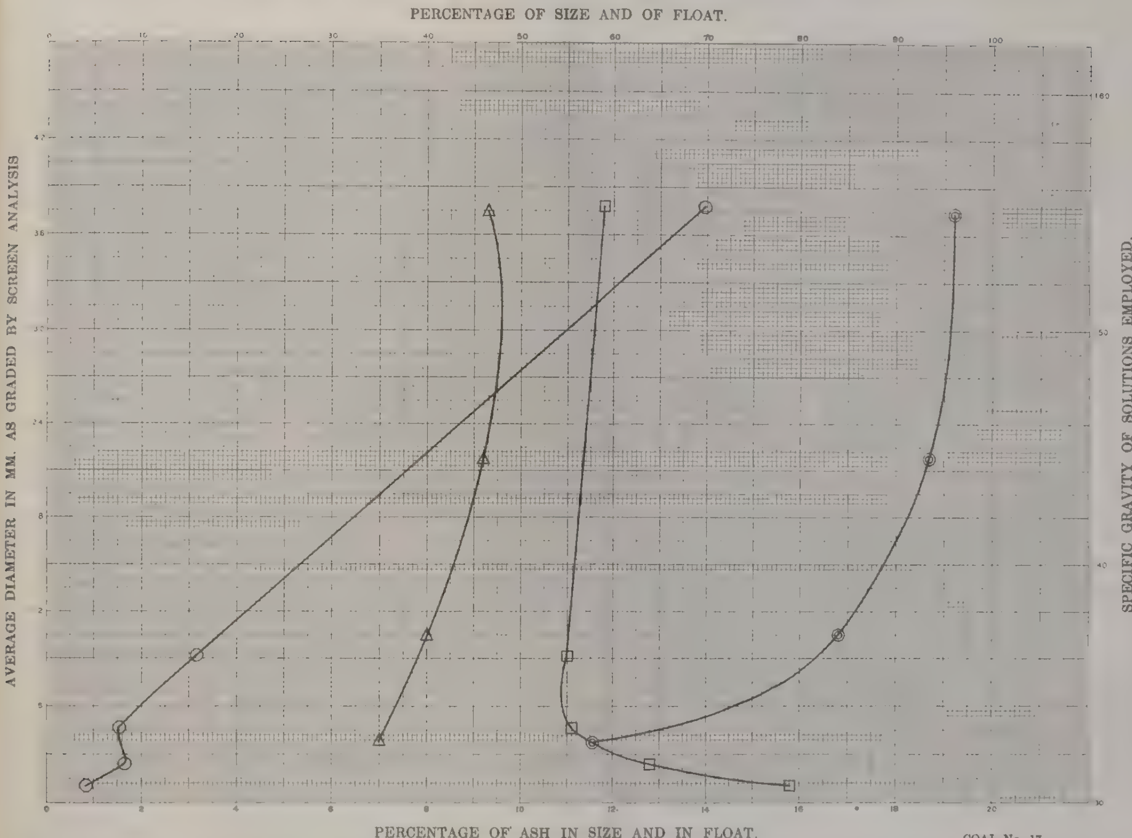
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | |
|---|---|---|---|---|
| 31. Recovery of washed coal, including good bone. .. | % | .... | Ratio to standard | .... |
| 32. Reduction in ash ............................ | % | .... | " " | .... |
| 33. " " sulphur. ............................ | % | .... | " " | .... |
| 34. Increase in calorific value—calorimeter ......... | % | .... | | |
| 35. Increase in evaporation under boiler............ | % | .... | | |
| 36. Decrease in clinker under boiler................ | % | .... | | |
| 37. Fuel ratio of original coal..................... | | .... | | |
| 38. " " washed " ..................... | | .... | | |
| 39. Calorific value of original coal................. | | .... | | |
| 40. " " washed " ................. | | .... | | |

*Remarks on Tables C, D, and E.*—The results of preliminary tests were such that it was not considered necessary to wash this coal.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. 17
Appendix I, Vol. III

**COAL.—No. 21 M.**

*Locality.*—Cumberland, Comox district, Vancouver island, B.C.

*Colliery.*—Wellington Colliery Co., Comox lower seam, No. 4 and No. 7 mines, mixed in equal parts.

*Sample.*—A sample was made up of equal quantities of coal taken from two separate mines,both working on the same seam. Seventy-five bags taken from the lower seam of No. 4. This mine is entered by a slope 1¼ miles long, and the coal was drawn from a number of different points. The coal had been cleaned on a ¾″ screen and had then been hand picked. Sampled April 11, 1908.

Seventy-five bags taken from the lower seam of the No. 7 mine. This mine is entered by a slope 2,400 feet long, and the sample came, mainly, from workings on the 1,800 ft. level. The coal was cleaned on a bar screen 16 feet long, with openings from ¾″ to 1″, and afterwards was hand picked by Chinese labourers. Sampled April 13, 1908.

TABLE A.

**Specific Gravity Tests.**

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·510 | 91·7 | 7·3 | 8·3 | 65·0 |
| 2. | 1·425 | 85·0 | 6·0 | 15·0 | 46·9 |
| 3. | 1·370 | 79·3 | 5·2 | 20·7 | 38·9 |
| 4. | 1·325 | 58·7 | 4·2 | 41·3 | 23·2 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 80·0 | % ash | 5·3 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 13·0 | " " | 21·7 |
| 7. | Useful coal—sum of (5) and (6) | " " | 93·0 | " " | 7·6 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 7·0 | " " | 71·5 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 12·0 |
| 10. | " " " " " " | | | % sulphur | 0·9 |
| 11. | " " " " " " | | | Fuel Ratio | 1·91 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | 2·06 |

*Remarks.*—The innate ash is fairly high, and the proportion of bone coal moderate, with high ash. The refuse is low in amount and high in ash. The coal, therefore, can be considerably improved by washing, as the proportion of ash in the refuse and bone is comparatively large.

TABLE B.

**Screen Analysis.**

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size. |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | 53·8 | 12·0 |
| 14. | 3·16 | 1·20 | 2·18 | 20·0 | 11·3 |
| 15. | 1·20 | 0·64 | 0·92 | 10·8 | 10·4 |
| 16. | 0·64 | 0·30 | 0·47 | 6·0 | 11·3 |
| 17. | 0·30 | 0·173 | 0·24 | 4·9 | 12·9 |
| 18. | 0·173 | 0·000 | 0·086 | 4·5 | 17·9 |

*Remarks.*—There seemed to be two ash-bearing materials in this coal, one more friable and the other less friable than the coal. The coal, itself, is comparatively strong and stands shipping and crushing well.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between 1″ and ½″ Total wt. lbs. | Ash. % | Sizes between ½″ and ⅛″ Total wt. lbs. | Ash. % | Sizes under ⅛″ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal .............. | 2885 | 12·2 | 1824 | 11·2 | 900 | 15·2 |
| 20. | Washed coal................ | 2733 | 8·7 | 1591 | 8·6 | 590 | 10·2 |
| 21. | Refuse—coarse............. | 140 | 50·1 | 116 | 49·1 | 71 | 53·7 |
| 22. | Hutch product............. | 109 | .... | 363* | .... | .... | .... |
| 23. | Jig slimes. ................ | .... | .... | 45 | 16·4 | .... | .... |
| 24. | Table slimes............... | .... | .... | .... | .... | 99 | 11·1 |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 25. | Original coal ........................ | wt. in lbs. | 5609 | % ash | 12·0 | % sulphur | 0·9 |
| 26. | Washed coal......................... | " " | 4914 | " " | 8·9 | " " | 0·8 |
| 27. | Refuse............................. | " " | 327 | " " | 50·6 | " " | |
| 28. | Other products...................... | " " | 341 | " " | .... | " " | .... |
| 29. | Loss.................................. | " " | 27 | " " | .... | " " | .... |
| 30. | Loss in % 0·5. | | | | | | |

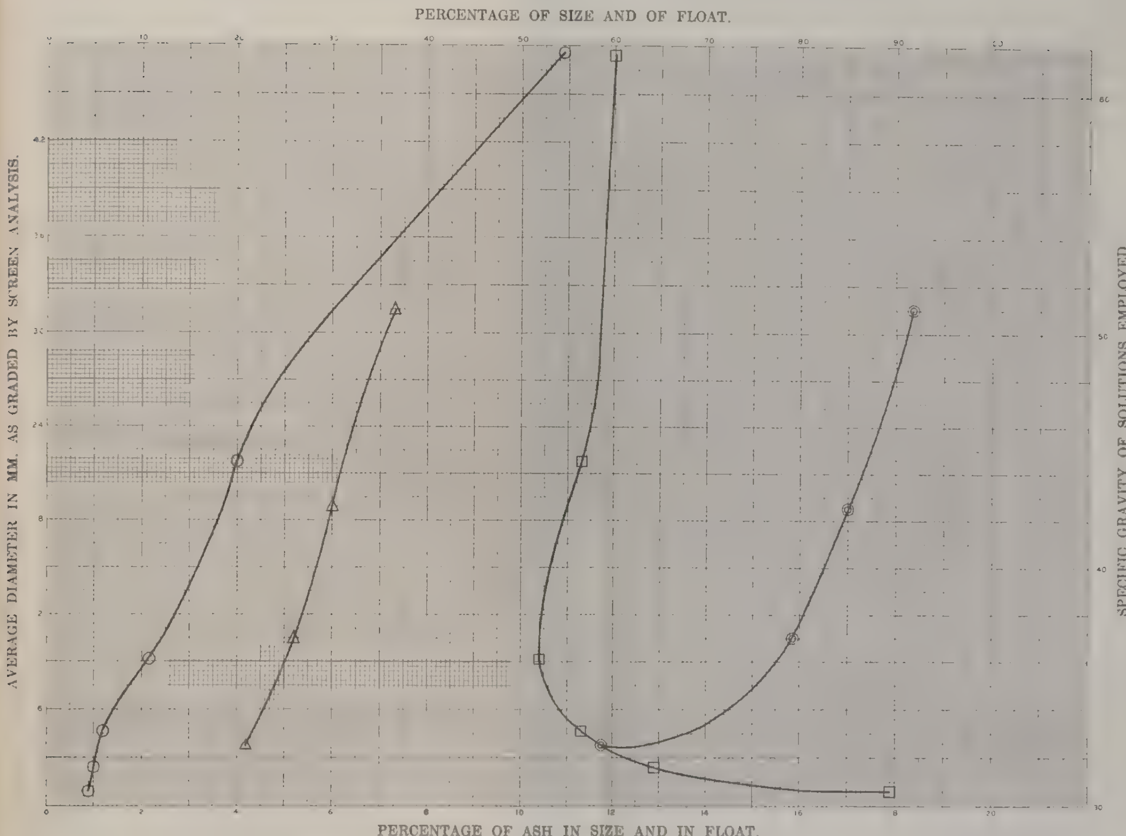
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | | |
|---|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone ...% | 87·5 | Ratio to standard | 94·2 |
| 32. | Reduction in ash...........................% | 25·8 | " " | 85·4 |
| 33. | " " sulphur...........................% | 11·1 | " " | .... |
| 34. | Increase in calorific value—calorimeter..........% | 4·4 | | |
| 35. | Increase in evaporation under boiler.............% | 5·5 | | |
| 36. | Decrease in clinker under boiler................% | 33·3 | | |
| 37. | Fuel ratio of original coal........................ | 1·91 | | |
| 38. | " " washed " ..................... | 1·96 | | |
| 39. | Calorific value of original coal.................. | 7230 | | |
| 40. | " " washed " ................. | 7550 | | |

*Remarks on Tables C, D, and E.*—The trial, on the whole, was fairly good, but the washed coal of the sizes from 1″ to ¼″, and under ¼″, should have contained less ash. Possibly, also, the ash in the medium sized refuse should have been higher. If it had been possible to repeat the test, better results would have been obtained, and a commercial plant would, undoubtedly, have done better after once getting in good working order.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
□ " " " " " " " " densities.
△ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. 21M
APPENDIX I, VOL. III

# VANCOUVER ISLAND.

## NORTHERN COAL FIELD.

ERRATUM

the curve diagrams accompanying the tabulated records of each of the coals tested, is the following legend:—

LEGEND: SYMBOLS

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

The above legend is incorrect; in each case it should read thus:—

○ Curve showing the relative quantities of the several sizes.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " material floating at the several densities.
△ " " " " " ash in " " " " " "

## COAL.—No. EX. 31.

*Locality.*—Alert bay, Vancouver island, B.C.

*Colliery.*—Pacific Coast Coal Co., Suquash mine.

*Sample.*—Ninety-one bags supplied by the mine authorities during development of the property. Sampled October, 1909.

### TABLE A.

### Specific Gravity Tests.

| | Specific gravity of solution. | Float % | Ash in Float % | Sink % | Ash in Sink % |
|---|---|---|---|---|---|
| 1. | 1·545 | 76·0 | 7·8 | 24·0 | 56·4 |
| 2. | 1·423 | 66·9 | 5·4 | 33·1 | 46·7 |
| 3. | 1·373 | 62·2 | 4·5 | 37·8 | 40·5 |
| 4. | 1·318 | 28·7 | 2·7 | 71·3 | 24·9 |

The following results are obtained from the above data, and from the chemists results :—

| | | | | | |
|---|---|---|---|---|---|
| 5. | Good coal, Sp. Gr. under 1·375 | % yield | 62·6 | % ash | 4·5 |
| 6. | Bone coal, Sp. Gr. 1·375 to 1·55 | " " | 13·9 | " " | 23·7 |
| 7. | Useful coal—sum of (5) and (6) | " " | 76·5 | " " | 8·0 |
| 8. | Refuse, Sp. Gr. over 1·55 | " " | 23·5 | " " | 54·0 |
| 9. | Assay of original sample raw coal as sent to chemist | | | " " | 23·0 |
| 10. | " " " " " " | | | % sulphur | 1·0 |
| 11. | " " " " " " | | | Fuel Ratio | 1·24 |
| 12. | Assay of mixed good and bone coal (5) and (6) | | | " " | .... |

*Remarks.*—The innate ash is moderately low. The bone coal is not large in amount but is high in ash. The refuse is large in amount and high in ash. The sample is probably dirtier than the output of the mine will be after the workings have reached a reasonable depth. The coal is eminently suited for washing, but may have to be crushed somewhat too fine.

### TABLE B.

### Screen Analysis.

| | Maximum Screen MM. | Minimum Screen MM. | Mean MM. | % of whole sample | % Ash in size |
|---|---|---|---|---|---|
| 13. | 6·34 | 3·16 | 4·75 | .... | .... |
| 14. | 3·16 | 1·20 | 2·18 | .... | .... |
| 15. | 1·20 | 0·64 | 0·92 | .... | .... |
| 16. | 0·64 | 0·30 | 0·47 | .... | .... |
| 17. | 0·30 | 0·173 | 0·24 | .... | .... |
| 18. | 0·173 | 0·000 | 0·086 | .... | .... |

*Remarks.*—No screen analyses were made on this coal.

TABLE C.

## Results of Washing (Details of Sizes).

| | Original coal and its products. | Sizes between $1\frac{1}{2}''$ and $\frac{3}{4}''$ Total wt. lbs. | Ash. % | Sizes between $\frac{3}{4}''$ and $\frac{1}{8}''$ Total wt. lbs. | Ash. % | Sizes under $\frac{1}{8}''$ Total wt. lbs. | Ash. % |
|---|---|---|---|---|---|---|---|
| 19. | Original coal .............. | 5830 | 25·0 | 3725 | 21·3 | 900 | 27·9 |
| 20. | Washed coal............... | 4989 | 16·6 | 2890 | 14·9 | 547 | 10·5 |
| 21. | Refuse—coarse............. | 574 | 48·4 | 530 | 49·5 | 192 | 53·9 |
| 22. | Hutch product............. | .... | .... | .... | .... | .... | .... |
| 23. | Jig slimes. ................ | 223 | 41·3 | 188 | 58·3 | ..49 | 44.9 |
| 24. | Table slimes............... | .... | .... | .... | .... | .... | .... |

TABLE D.

## Results of Washing (Totals).

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 25. | Original coal ........................ | wt. in lbs. | 10455 | % ash | 23·0 | % sulphur | 1·0 |
| 26. | Washed coal........................ | " " | 8426 | " " | 15·1 | " " | 0·9 |
| 27. | Refuse............................ | " " | 1296 | " " | 49·4 | " " | .... |
| 28. | Other products..................... | " " | 460 | " " | 48·7 | " " | .... |
| 29. | Loss............................... | " " | 273 | " " | .... | " " | .... |
| 30. | Loss in % 2·6. | | | | | | |

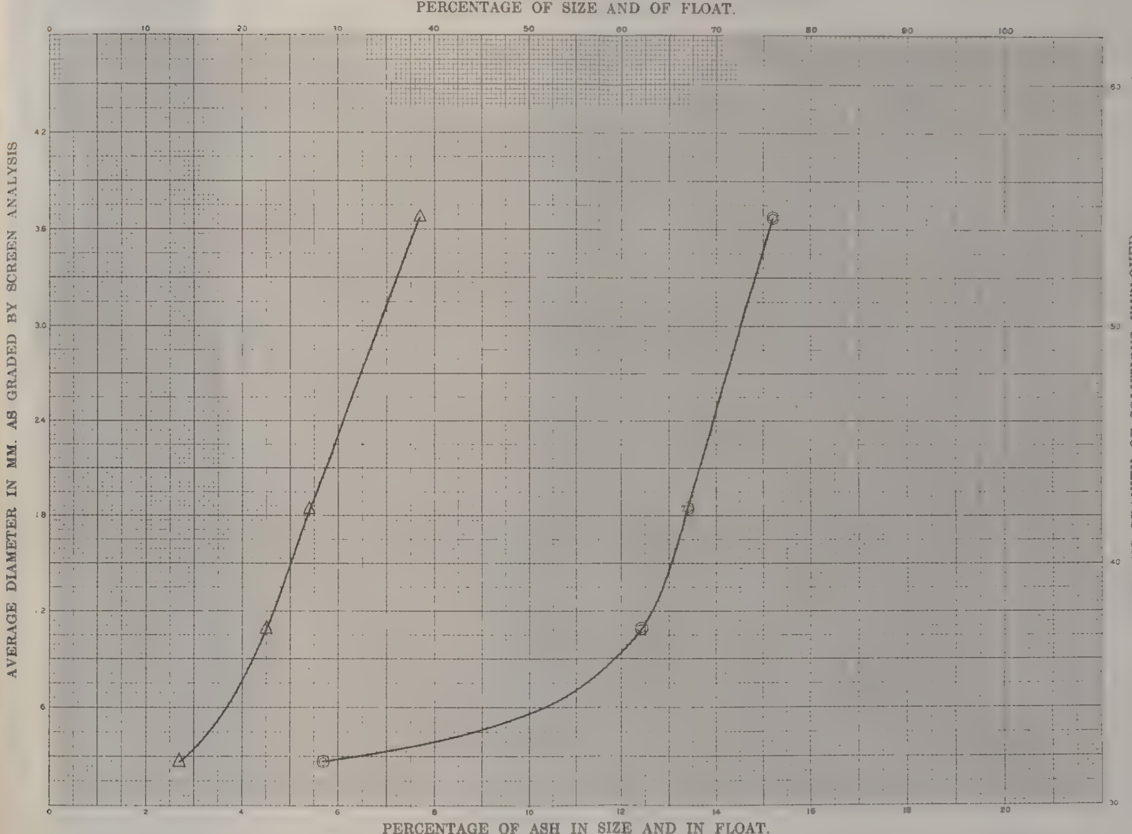
TABLE E.

## Summary Statement of Effect of Washing on Fuel Values.

| | | | | | |
|---|---|---|---|---|---|
| 31. | Recovery of washed coal, including good bone. . . | % | 80·6 | Ratio to standard | 106·0 |
| 32. | Reduction in ash.............................. | % | 34·3 | " " | 52·9 |
| 33. | " " sulphur. ....................... | % | 10·0 | " " | .... |
| 34. | Increase in calorific value—calorimeter.......... | % | 4·1 | | |
| 35. | Increase in evaporation under boiler........... | % | .... | | |
| 36. | Decrease in clinker under boiler............... | % | .... | | |
| 37. | Fuel ratio of original coal...................... | | 1·24 | | |
| 38. | " " washed " .................... | | 1·31 | | |
| 39. | Calorific value of original coal.................. | | 6170 | | |
| 40. | " " washed " ................ | | 6420 | | |

*Remarks on Tables C, D, and E.*—This trial was only moderately satisfactory in its results, owing to the fact that an attempt was made to crush the coal as little as possible. The coal is also somewhat unusual in character, and much better results could have been obtained in a second trial, especially with finer crushing.

# GRAPHIC RECORD OF SIZING AND SPECIFIC GRAVITY TESTS.




LEGEND: SYMBOLS.

○ Curve showing the relative quantities of the several sizes.
△ " " " " " " " " densities.
□ " " " percentage of ash in each of the several sizes.
◎ " " " " " " " material floating at the several densities.

COAL No. Ex. 34
APPENDIX I, VOL. III

TABLE XI.

## SUMMARY RECORD OF COAL WASHING TESTS, SYDNEY COAL FIELD, CAPE BRETON COUNTY, NOVA SCOTIA.

| Official number of the colliery as per list on page 8, Vol. I, of report | | No. 50 | No. 36 | No. 35 | No. 35 SP | No. 38 | No. 37 | No. 39 | No. 13 | No. 12 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Proximate analysis, etc., of official samples** | | | | | | | | | | |
| 1. Moisture in the check sample sealed at mine | % | | 3·5 | 2·4 | 3·4 | 3·5 | 4·0 | 4·9 | 3·5 | 5·4 |
| 2. Volatile matter in main sample after drying | % | 34·7 | 36·5 | 38·6 | 35·0 | 31·3 | 35·1 | 37·3 | 37·4 | 39·0 |
| 3. **Fixed carbon " " " " "** | % | **53·0** | **57·6** | **55·5** | **59·5** | **59·8** | **53·8** | **57·9** | **55·4** | **54·3** |
| 4. **Ash " " " " "** | % | **12·3** | **5·9** | **5·9** | **5·5** | **5·9** | **11·1** | **4·8** | **7·2** | **6·7** |
| 5. **Sulphur " " " " "** | % | **6·4** | **2·4** | **3·7** | **1·8** | **1·9** | **2·5** | **1·8** | **2·9** | **2·5** |
| 6. Calorific value of " " " " | Cal | 7010 | 7700 | 7780 | 7800 | 7780 | 7290 | 7660 | 7650 | 7600 |
| 7. Calorific value calculated to ash free dry coal | Cal | 7990 | 8180 | 8270 | 8250 | 8270 | 8200 | 8050 | 8250 | 8150 |
| **Proximate analysis, etc., of combined product of large scale washing tests** | | | | | | | | | | |
| 8. Volatile matter in washed coal after drying | % | | 38·2 | | | | 36·9 | | 40·2 | |
| 9. **Fixed carbon " " " " "** | % | ........ | **59·1** | ........ | ........ | ........ | **57·3** | ........ | **56·3** | |
| 10. **Ash " " " " "** | % | ........ | **2·7** | ........ | ........ | ........ | **5·8** | ........ | **3·5** | |
| 11. **Sulphur " " " " "** | % | ........ | **2·0** | ........ | ........ | ........ | **2·1** | ........ | **1·9** | |
| 12. Calorific value of " " " " | Cal | | 7950 | | | | 7710 | | 8050 | |
| 13. **Calorific value calculated to ash free dry washed coal** | **Cal.** | ........ | **8170** | ........ | ........ | ........ | **8190** | ........ | **8340** | |
| 14. **Ash in refuse from coal washing—after drying** | **%** | ........ | **54·0** | ........ | ........ | ........ | **47·0** | ........ | **43·5** | |
| **Experimental washing tests with heavy solutions on fine crushed coal of official samples** | | | | | | | | | | |
| 15. Clean coal of under 1,375 | yield % | 62·8 | 90·5 | 86·5 | 90·5 | 88·3 | 77·5 | 91·0 | 87·0 | 88·0 |
| 16. **" " " " "** | **ash %** | **3·4** | **1·9** | **2·8** | **2·7** | **2·6** | **3·5** | **2·2** | **1·9** | **2·4** |
| 17. Bony " " between 1,375 and 1,550 | yield % | 20·0 | 3·5 | 6·5 | 7·5 | 5·2 | 9·5 | 3·0 | 3·5 | 6·2 |
| 18. **" " " " " " "** | **ash %** | **12·1** | **13·8** | **6·1** | **12·5** | **18·2** | **18·1** | **5·0** | **12·2** | **16·1** |
| 19. Refuse of over 1,550 | yield % | 17·2 | 6·0 | 7·0 | 2·0 | 6·5 | 13·0 | 6·0 | 9·5 | 5·8 |
| 20. " " " " | ash % | 48·6 | 60·9 | 50·0 | 66·0 | 48·3 | 60·0 | 50·0 | 61·6 | 58·5 |
| 21. Useful coal, being combined clean and bony | yield % | 82·8 | 94·0 | 93·0 | 98·0 | 93·5 | 87·0 | 94·0 | 90·5 | 94·2 |
| 22. **" " " " " " "** | **ash %** | **5·5** | **2·4** | **3·0** | **3·0** | **3·5** | **5·2** | **2·3** | **2·3** | **3·3** |
| **Summary statement of results of washing** | | | | | | | | | | |
| 23. **Yield of washed coal—combined product all sizes** | **%** | ........ | **92·5** | ........ | ........ | ........ | **88·5** | | 89·4 | |
| 24. **Perfection of yield as compared with heavy solution tests** | **%** | | 98·4 | | | | 101·8 | | 98·7 | |
| 25. **Reduction in ash due to washing** | **%** | | 54·3 | | | | 47·8 | | 51·4 | |
| 26. **Perfection ash reduction compared with heavy solution tests** | % | | 88·9 | | | | 89·6 | | 65·7 | |
| 27. **Reduction in sulphur due to washing** | % | | 16·7 | | | | 16·0 | | 34·5 | |
| 28. **Increase in calorific value due to washing** | **%** | .. | 3·2 | | | | 5·7 | | 5·2 | |
| 29. " " boiler evaporation due to washing | % | | 5·6 | | | | 5·8 | | 4·8 | |
| 30. **Yield of refuse from washing tests** | **%** | .. | 6·9 | | | | 11·7 | | 8·1 | |
| 31. **Decrease in clinker in boiler furnace due to washing** | **%** | | 60·9 | | | | 52·2 | | 66·1 | |

### Notes and Comments.

50 = *Gowrie Seam, N. A. Collieries Ltd.* (S. and P.)* This coal was not included in the original list as the colliery was closed, but later a small sample of freshly mined coal was obtained and tested. This sample, which however may not have truly represented the best that the seam could produce under more favourable conditions is poorer in quality than any of the other seams sampled in this field. It would, however, apparently wash easily and [illegible] good washed fuel.

36 = *Hub Seam, Dom. C. Co. No. 2 Main.* (S. and P.) This coal is quite low in ash and is an excellent [illegible] sense it is in no need of washing. It was, however, washed in order to compare the results of a full scale trial with the specific gravity test in the laboratory. The [illegible] is quite satisfactory and the washed **coal is an exceptionally high class fuel.**

35 = ***Harbour Seam, Dom. C. Co. No. 9.*** (S. and P.) This coal is an excellent fuel as it stands, and was not washed. Its screenings probably carry a considerable part of what ash there is, and the specific gravity tests show that they can be materially improved by washing if desired.

35 SP = *Phalen Seam, Dom. C. Co. No. 5.* (S. and P.) The remarks on sample 35 apply also to this coal, except that washing the slack would probably effect less improvement.

38 = *Phalen Seam, Dom. C. Co. No. 1.* (S. and P.) The remarks on sample 35 apply to this coal.

37 = *Emery Seam, Dom. C. Co. No. 10.* (R.M. and P.) This has the highest ash of any of the Dom. C. Co. samples and the specific gravity tests showed that it should wash well. A trial was, therefore, run with satisfactory results. Under present conditions washing is not commercially necessary except for coking, but when the market **demands it an excellent washed coal can easily be produced.**

39 = ***Lingan Seam, Dom. C. Co. No. 12.*** **(R.M.)** Reference to the detailed tests in Volume III will show that this sample indicates a seam of exceptionally good quality. Washing is commercially quite unnecessary, although the screenings might be washed successfully if a very low ash slack were desired.

13 = *Main Seam, N.S.S. & C. Co. No. 1.* (S. and P.) This coal does not require washing for ordinary commercial use, but should be washed for coking. Its screenings contain considerable amounts of ash and sulphur and are regularly washed by the Company, producing an excellent material quite suitable for coking. The washing trial shows satisfactory results which agree well with the Company's returns.

12 = *Main Seam, N.S.S. & C. Co. No. 3.* (S. and P.) The remarks on No. 13 apply to this coal, although washing is even less necessary and would probably effect somewhat less improvement. The screenings could be washed with advantage, but the coal is [illegible] No. 13 that no trial was run.

***S = Screened coal. P = Hand picked to remove rubbish. R.M. = Run of mine.**

TABLE XII

## SUMMARY RECORD OF COAL WASHING TESTS, INVERNESS AND PICTOU FIELDS.

| | Inverness Co., N.S. | | Pictou County, N.S. | | | | | |
|---|---|---|---|---|---|---|---|---|
| Official number of the colliery as per list on page 8, Vol. I, of report | No. 14 | No. 15 | No. 4 | No. 16 | No. 1 | No. 2 | No. 8 | No. 3 |
| **Proximate analysis, etc., of official samples** | | | | | | | | |
| 1. Moisture in the check sample sealed at mine ... % | 9·3 | 4·7 | 2·1 | 3·6 | ...... | 3·6 | 1·8 | 1·4 |
| 2. Volatile matter in main sample after drying ... % | 40·0 | 37·1 | 32·1 | 33·3 | 29·8 | 31·4 | 26·0 | 24·7 |
| 3. Fixed carbon " " " " " ... % | 49·6 | 48·3 | 50·6 | 55·4 | 55·5 | 58·1 | 64·8 | 60·8 |
| 4. Ash " " " " " ... % | 10·4 | 14·6 | 17·3 | 11·3 | 14·7 | 10·5 | 9·2 | 14·5 |
| 5. Sulphur " " " " " ... % | 6·0 | 7·9 | 1·0 | 0·6 | 1·4 | 0·9 | 0·9 | 2·5 |
| 6. Calorific value of " " " " ... Cal | 6750 | 6540 | 6680 | 7350 | 6990 | 7320 | 7700 | 7200 |
| 7. Calorific value calculated to ash free dry coal ... Cal | 7530 | 7660 | 8080 | 8290 | 8200 | 8180 | 8480 | 8420 |
| **Proximate analysis, etc., of combined product of large scale washing tests** | | | | | | | | |
| 8. Volatile matter in washed coal after drying ... % | 42·5 | 37·9 | 33·2 | .... | 30·8 | .... | | 25·3 |
| 9. Fixed carbon " " " " " ... % | 51·0 | 51·2 | 54·2 | ........ | 56·9 | ........ | ........ | 63·4 |
| 10. Ash " " " " " ... % | 6·5 | 10·9 | 12·6 | ........ | 12·3 | ........ | ........ | 11·3 |
| 11. Sulphur " " " " " ... % | 5·0 | 6·7 | 1·0 | ........ | 1·0 | ........ | ........ | 1·3 |
| 12. Calorific value of " " " " ... Cal | 7110 | 6970 | 7090 | | 7250 | | | 7530 |
| 13. Calorific value calculated to ash free dry washed coal ... Cal | 7610 | 7820 | 8110 | | 8270 | | | 8490 |
| 14. Ash in refuse from coal washing—after drying ... % | 34·4 | 26·8 | 58·3 | | 33·1 | ... | | 36·0 |
| **Experimental washing tests with heavy solutions on fine crushed coal of official samples** | | | | | | | | |
| 15. Clean coal of under 1,375 ... yield % | 65·0 | 38·0 | 64·6 | 83·7 | 77·5 | 71·7 | 79·4 | 77·0 |
| 16. " " " " " ... ash % | 3·6 | 4·9 | 8·7 | 7·2 | 10·0 | 5·9 | 4·0 | 7·3 |
| 17. Bony " " between 1,375 and 1,550 ... yield % | 20·0 | 40·0 | 21·9 | 11·8 | 13·5 | 23·3 | 14·9 | 12·0 |
| 18. " " " " " " " ... ash % | 11·7 | 12·0 | 15·5 | 16·9 | 18·9 | 14·8 | 21·1 | 24·6 |
| 19. Refuse of over 1,550 ... yield % | 15·0 | 22·0 | 13·5 | 4·5 | 9·0 | 5·0 | 5·7 | 11·0 |
| 20. " " " " ... ash % | 39·1 | 36·5 | 56·8 | 57·4 | 48·0 | 50·2 | 45·3 | 50·8 |
| 21. Useful coal, being combined clean and bony ... yield % | 85·0 | 78·0 | 86·5 | 95·5 | 91·0 | 95·0 | 94·3 | 89·0 |
| 22. " " " " " " " ... ash % | 5·6 | 8·3 | 10·5 | 8·4 | 11·4 | 8·1 | 6·7 | 9·7 |
| **Summary statement of results of washing** | | | | | | | | |
| 23. Yield of washed coal—combined product all sizes ... % | 86·7 | 75·5 | 82·5 | ... | 86·0 | ... | .... | 82·0 |
| 24. Perfection of yield as compared with heavy solution tests ... % | 102·0 | 96·8 | 95·4 | ...... | 94·5 | ........ | ........ | 92·1 |
| 25. Reduction in ash due to washing ... % | 37·5 | 25·4 | 27·2 | ........ | 16·3 | ........ | ........ | 22·1 |
| 26. Perfection ash reduction compared with heavy solution tests % | 86·1 | 76·1 | 83·3 | . | 92·7 | . | | 85·8 |
| 27. Reduction in sulphur due to washing ... % | 16·7 | 15·2 | 0·0 | .... | 28·6 | ........ | ........ | 48·0 |
| 28. Increase in calorific value due to washing ... % | 5·3 | 6·6 | 6·1 | ........ | 3·7 | ........ | ........ | 4·3 |
| 29. " " boiler evaporation due to washing ... % | 5·9 | 5·8 | 4·2 | ........ | 7·2 | ........ | ........ | 8·3 |
| 30. Yield of refuse from washing tests ... % | 13·3 | 22·9 | 15·6 | ........ | 12·1 | ........ | ........ | 15·0 |
| 31. Decrease in clinker in boiler furnace due to washing % | 56·7 | 39·4 | 33·4 | | 9·6 | . | ... | 35·3 |

### Notes and Comments.

*Inverness Field.*

14 = *Inverness Coal, I. C. & R. Co.* (S and P.)* The coals of the Inverness field carry exceptional quantities of sulphur, much of which occurs in a form which is difficult or impossible to remove. The ash is also moderately high, but can be reduced by washing. A trial was run, but as anticipated it failed to reduce the sulphur materially, and in view of this it is questionable whether washing would be commercially profitable, in spite of the fact that it [illegible] improves the coal for use in boilers.

15 = *Port Hood Coal, R. R. & C. Co.* (S and P.) The remarks on No. 14 apply to this coal, but this sample shews even more ash and sulphur and the specific gravity tests indicate greater difficulty in washing. A trial was run and confirmed these anticipations.

*Pictou Field.*

4 = *Six Foot Seam, A. C. Co., Vale Colliery* (S and P.) This sample carried enough ash to justify washing although the specific gravity tests indicated that it would not yield a very high class fuel, on account of the high inherent ash. The trial confirmed these indications but, nevertheless, produced a good yield of good clean coal.

16 = *Foord Seam, A. C. Co., Acadia Seam* (R. M. P.) This coal was not washed as the ash is not high for run of mine coal and the specific gravity tests indicate that washing will be only moderately effective. It could, however, be somewhat improved, and, if screened, the fines could almost certainly be decidedly benefited by washing, although the data at hand do not suffice to determine the commercial expediency of such treatment.

1 = *Third Seam, A. C. Co., Albion Colliery* (R. M.) This coal, although moderately high in ash, is so constituted as to benefit comparatively little by washing, except in the matter of sulphur. It was, however, washed with fairly satisfactory results. Screenings would undoubtedly benefit very much more than run of mine coal.

2 = *Cage Pit Seam, A. C. Co., Albion Colliery* (R. M.) This coal is comparatively low in ash for run of mine and fortunately so, as the specific gravity tests indicate that it cannot be largely improved by washing. Its screenings could no doubt be washed with greater advantage.

8 = *Main Seam, A. C. Co., Acadia Colliery* (S and P.) This sample shows less ash and higher calorific power than any other in the field, but this may be because it is screened and hand picked coal whereas all the others are run of mine. The coal does not require washing commercially and would not benefit very largely by it in any case, but the screenings which were not sampled probably carry more impurity and it may be desirable to wash them.

3 = *Main Seam, I. C. Co., Drummond Colliery* (S and P.) This sample is high in ash and sulphur for screened coal from this field, but fortunately the specific gravity tests show it to be more suitable for washing than most of the other samples, its sulphur in particular being easily reduced by one half. The washing trial confirmed the preliminary tests. The screenings were not sampled but they are probably poorer than this sample and would benefit considerably more by washing.

*S = Screened coal. P = Hand picked to remove rubbish. R.M. = Run of mine.

TABLE XIII

## SUMMARY RECORD OF COAL WASHING TESTS, SPRINGHILL, JOGGINS, AND GRAND LAKE FIELDS.

| | Springhill Field, N.S. | | Joggins-Chignecto Field, N.S. | | | Grand Lake Field N.B. |
|---|---|---|---|---|---|---|
| Official number of the colliery as per list on page 9, Vol. I, of report | No 5 | No 6 | No 7 | No 9 | No 10 | No 11 |
| **Proximate analysis, etc., of official samples** | | | | | | |
| 1. Moisture in the check sample sealed at mine . . % | 2·8 | 2·8 | 3·6 | 3·8 | 1·3 | 1·3 |
| 2. Volatile matter in main sample after drying . . . % | 32·3 | 33·5 | 41·0 | 35·7 | 36·6 | 32·2 |
| 3. Fixed carbon " " " " " . . . % | 58·5 | 55·0 | 45·7 | 48·8 | 44·8 | 53·4 |
| 4. Ash " " " " " . . . % | 9·2 | 11·5 | 13·3 | 15·5 | 18·6 | 14·4 |
| 5. Sulphur " " " " " . . . % | 1·6 | 1·8 | 6·4 | 6·7 | 5·4 | 5·8 |
| 6. Calorific value of " " " " Cal | 7430 | 7220 | 6730 | 6570 | 6440 | 7160 |
| 7. Calorific value calculated to ash free dry coal . Cal | 8180 | 8160 | 7790 | 7780 | 7910 | 8360 |
| **Proximate analysis, etc., of combined product of large scale washing tests** | | | | | | |
| 8. Volatile matter in washed coal after drying . . . % | 33·1 | 34·7 | 41·3 | 37·3 | 38·1 | 34·0 |
| 9. Fixed carbon " " " " " " . . . % | 59·8 | 57·0 | 49·6 | 51·7 | 51·6 | 56·6 |
| 10. Ash " " " " " " . . . % | 7·1 | 8·3 | 9·1 | 11·0 | 10·3 | 9·4 |
| 11. Sulphur " " " " " " . . . % | 1·4 | 1·5 | 6·2 | 6·3 | 4·8 | 4·9 |
| 12. Calorific value of " " " " . Cal | 7700 | 7540 | 7160 | 7000 | 7080 | 7680 |
| 13. Calorific value calculated to ash free dry washed coal Cal | 8290 | 8220 | 7880 | 7870 | 7890 | 8480 |
| 14. Ash in refuse from coal washing after drying % | 31·5 | 45·0 | 51·0 | 49·5 | 46·0 | 38·5 |
| **Experimental washing tests with heavy solutions on fine crushed coal of official samples** | | | | | | |
| 15. Clean coal of under 1,375 . . . yield % | 81·0 | 80·0 | 61·5 | 57·2 | 61·5 | 56·8 |
| 16. " " " " . . . ash % | 5·1 | 5·4 | 5·4 | 4·6 | 6·0 | 4·4 |
| 17. Bony " " between 1,375 and 1,550 . . . yield % | 10·5 | 10·0 | 27·5 | 19·1 | 17·0 | 19·2 |
| 18. " " " " " " " . . . ash % | 14·7 | 19·0 | 12·9 | 9·7 | 13·0 | 15·1 |
| 19. Refuse of over 1,550 . . . yield % | 8·5 | 10·0 | 11·0 | 23·7 | 21·5 | 24·0 |
| 20. " " " " . . . ash % | 47·3 | 48·5 | 40·0 | 45·0 | 53·0 | 38·6 |
| 21. Useful coal, being combined clean and bony . yield % | 91·5 | 90·0 | 89·0 | 76·3 | 78·5 | 76·0 |
| 22. " " " " " " " . . . ash % | 6·1 | 7·1 | 7·5 | 5·9 | 7·8 | 6·9 |
| **Summary statement of results of washing** | | | | | | |
| 23. Yield of washed coal—combined product all sizes . . . % | 81·6 | 87·0 | 87·0 | 79·4 | 78·7 | 82·4 |
| 24. Perfection of yield as compared with heavy solution tests % | 89·2 | 96·7 | 97·8 | 104·1 | 100·2 | 108·3 |
| 25. Reduction in ash due to washing % | 22·8 | 27·8 | 31·6 | 29·0 | 44·6 | 34·7 |
| 26. Perfection ash reduction compared with heavy solution tests % | 85·9 | 85·5 | 82·5 | 53·7 | 75·7 | 73·4 |
| 27. Reduction in sulphur due to washing . . . % | 12·5 | 16·7 | 3·1 | 6·0 | 11·2 | 15·5 |
| 28. Increase in calorific value due to washing . . . % | 3·7 | 4·4 | 6·1 | 6·5 | 9·9 | 7·3 |
| 29. " " boiler evaporation due to washing . . . % | 12·7 | 22·1 | 11·2 | 9·3 | 10·8 | 13·7 |
| 30. Yield of refuse from washing tests . . . % | 16·6 | 11·1 | 10·5 | 17·8 | 20·1 | 16·0 |
| 31. Decrease in clinker in boiler furnace due to washing . . . % | 37·8 | 36·4 | 34·3 | 3·6 | 53·6 | 18·3 |

## Notes and Comments.

*Springhill Field.*

5 = *Springhill, C. Ry. & C. Co., No. 2.* (S. and P.)* This coal does not require washing under present commercial conditions, and its sulphur, which is rather high for coke making, does not wash out to any considerable extent. It was, however, washed with moderately good results, and if slack had been tested it would no doubt, have shown still greater improvement.

6 = *Springhill, C. Ry. & C. Co., No. 3.* (S. and P.) This coal is similar to No. 5 but in somewhat greater need of washing and is better adapted to such treatment. It was washed with good results, particularly as regards steaming qualities. The screenings were not sampled but unquestionably would have been even more improved by washing.

*Joggins-Chignecto Field.*

7 = *Chignecto Coal, M. C. R. & P. Co.* (Special) This sample differed from all other main lots in having been taken by the Company rather than by a member of the testing staff. It is possible to considerably reduce the ash and thus to improve the quality of the coal by washing, but the sulphur even in the washed coal is far too high for coke making, and it is unlikely that washing would prove commercially profitable under present conditions, although the screenings can probably be treated with advantage.

9 = *River Hebert Coal, Minudie C. Co.* (S. and P.) This coal is similar in character to No. 7, but is more difficult to wash satisfactorily. If crushed very small it and the other coals from this field could be washed much cleaner, but this is commercially out of the question at present, as they are not suitable for coking and there is no other considerable demand for fine washed coal.

10 = *Joggins Coal, C. C. & Ry. Co.* (S. and P.) This sample is similar to the two others from the same field but carries more ash and less sulphur. It is a better coal to wash than either of the others, the improvement in steaming qualities being particularly marked. In general the remarks on 7 and 9 apply to this coal also.

*Grand Lake, N.B., Field.*

11 = *King's Mine, Minto.* (S. and P.) This coal is different in character from the other eastern coals and cannot be very easily compared with them. It can be washed much cleaner than the trial indicates, but only by wasting an unduly large percentage of coaly material. Under present conditions washing the run of the mine would not be commercially justifiable, but possibly the screenings could be treated with advantage.

*S = Screened coal. P = Hand picked to remove rubbish. R. M. = Run of mine.

TABLE XIV

## SUMMARY RECORD OF COAL WASHING TESTS, ALBERTA AND SASKATCHEWAN LIGNITE FIELDS.

| | Souris Field, Sask. | | Edmonton Field, Alta. | | | Belly River Field, Alta. | |
|---|---|---|---|---|---|---|---|
| Official number of the colliery as per list on page 9, Vol. I, of report | No. 40 | No. 41 | No. 46 | No. 42 | No. 45 | No. 43 | No. 44 |
| Proximate analysis, etc., of official samples | | | | | | | |
| 1. Moisture in the check sample sealed at mine % | 28·6 | 30·9 | 22·7 | 22·5 | 23·5 | 13·0 | 8·4 |
| 2. Volatile matter in main sample after drying % | 49·0 | 40·0 | 41·0 | 37·8 | 42·0 | 36·0 | 37·5 |
| 3. Fixed carbon " " " " " % | 42·9 | 43·2 | 47·6 | 51·3 | 49·9 | 49·9 | 51·5 |
| 4. Ash " " " " " % | 8·1 | 16·8 | 11·4 | 10·9 | 8·1 | 14·1 | 11·0 |
| 5. Sulphur " " " " " % | 0·6 | 0·5 | 0·4 | 0·4 | 0·4 | 1·4 | 0·8 |
| 6. Calorific value of " " " " Cal. | 5940 | 5360 | 5960 | 6060 | 6310 | 6130 | 6510 |
| 7. Calorific value calculated to ash free dry coal Cal | 6470 | 6440 | 6730 | 6800 | 6870 | 7140 | 7310 |
| Proximate analysis, etc., of combined product of large scale washing tests | | | | | | | |
| 8. Volatile matter in washed coal after drying % | | | | | | | |
| 9. Fixed carbon " " " " " % | | | | | | | |
| 10. Ash " " " " " % | | | | | | | |
| 11. Sulphur " " " " " % | | | | | | | |
| 12. Calorific value of " " " " Cal | | | | | | | |
| 13. Calorific value calculated to ash free dry washed coal Cal | | | | | | | |
| 14. Ash in refuse from coal washing—after drying % | | | | | | | |
| Experimental washing tests with heavy solutions on fine crushed coal of official samples | | | | | | | |
| 15. Clean coal of under 1,375 yield % | | | 0·0 | 0·0 | 0·0 | 34·0 | 83·5 |
| 16. " " " " ash % | | | 0·0 | 0·0 | 0·0 | 5·4 | 6·8 |
| 17. Bony " " between 1,375 and 1,550 yield % | | | 97·0 | 96·0 | 97·0 | 60·0 | 12·0 |
| 18. " " " " " " " ash % | | | 7·8 | 10·2 | 8·0 | 15·4 | 20·0 |
| 19. Refuse of over 1,550 yield % | 5·0 | | 3·0 | 4·0 | 3·0 | 6·0 | 4·5 |
| 20. " " " " ash % | 25·0 | | 57·8 | 55·0 | 41·3 | 45·0 | 52·0 |
| 21. Useful coal being combined clean and bony yield % | 95·0 | | 97·0 | 96·0 | 97·0 | 94·0 | 95·5 |
| 22. " " " " " " " ash % | 7·2 | | 7·8 | 10·2 | 8·0 | 11·8 | 8·4 |
| Summary statement of results of washing | | | | | | | |
| 23. Yield of washed coal—combined product all sizes % | | | | | | | |
| 24. Perfection of yield as compared with heavy solution tests % | | | | | | | |
| 25. Reduction in ash due to washing % | | | | | | | |
| 26. Perfection ash reduction compared with heavy solution tests % | | | | | | | |
| 27. Reduction in sulphur due to washing % | | | | | | | |
| 28. Increase in calorific value due to washing % | | | | | | | |
| 29. " " boiler evaporation due to washing % | | | | | | | |
| 30. Yield of refuse from washing tests % | | | | | | | |
| 31. Decrease in clinker in boiler furnace due to washing % | | | | | | | |

### Notes and Comments.

*Souris Field—Lignites.*

40 = *Western Dom. Collieries, Taylorton, Sask.* (S. and P.)*
41 = *Eureka Coal & B. Co., Estevan, Sask.* (R.M.)

*Edmonton Field—Lignites*

46 = *Strathcona Coal Co., Strathcona, Alta.* (S.)
42 = *Parkdale Coal Co., Edmonton, Alta.* (S.)
45 = *Standard Coal Co., Edmonton, Alta.* (S.)
These coals are all true lignites and all are reasonably clean as regards impurities which can be removed by washing. None were washed.

*Belly River Field—Lignitic Coals.*

43 = *Canada West Coal Co., Taber, Alta.* (S.)
44 = *Galt Coal, A. R. & I. Co., Lethbridge, Alta.* (S. and P.)
These coals are lignitic in character, being intermediate between true lignites and bituminous coal. They contain more [illegible] than the lignites proper but not enough to justify washing. They are very satisfactory coals for domestic purposes.

* = Screened coal. P = Hand picked to remove rubbish.

TABLE XV

## SUMMARY RECORD OF COAL WASHING TESTS, EASTERN CROWSNEST PASS COAL FIELDS.

| | Lundbreck, Alta. | Frank, Alta. | | | | Coleman, Alta. | |
|---|---|---|---|---|---|---|---|
| Official number of the colliery as per list on page 10, Vol. I, of report | No 47 | No 48 | No 32 | No 33 | No 28 | No 34 | No 34 SP |
| Proximate analysis, etc., of official samples | | | | | | | |
| 1. Moisture in the check sample sealed at mine....% | 5·0 | 1·9 | 3·0 | 0·9 | 1·7 | 2·0 | 2·0 |
| 2. Volatile matter in main sample after drying....% | 30·1 | 27·0 | 29·3 | 27·6 | 25·0 | 25·1 | 23·9 |
| 3. Fixed carbon " " " " " ....% | 40·2 | 55·1 | 55·4 | 56·9 | 58·6 | 55·1 | 59·9 |
| 4. Ash " " " " " ....% | 29·7 | 17·9 | 15·3 | 15·5 | 16·4 | 19·8 | 16·2 |
| 5. Sulphur " " " " " ....% | 1·2 | 0·6 | 0·6 | 0·8 | 0·5 | 0·4 | 0·6 |
| 6. Calorific value of " " " " ....Cal. | 5450 | 6800 | 6920 | 6880 | 6930 | 6510 | 6960 |
| 7. Calorific value calculated to ash free dry coal....Cal. | 7750 | 8280 | 8170 | 8140 | 8290 | 8120 | 8310 |
| Proximate analysis, etc., of combined product of large scale washing tests | | | | | | | |
| 8. Volatile matter in washed coal after drying....% | .... | .... | 29·8 | 28·4 | | 26·4 | |
| 9. Fixed carbon " " " " " ....% | .... | .... | 60·4 | 58·9 | | 62·0 | |
| 10. Ash " " " " " ....% | .... | .... | 9·8 | 12·7 | | 11·6 | |
| 11. Sulphur " " " " " ....% | .... | .... | 0·5 | 0·5 | | 0·4 | |
| 12. Calorific value of " " " " ....Cal. | .... | .... | 7450 | 7210 | | 7320 | |
| 13. Calorific value calculated to ash free dry washed coal....Cal. | .... | .... | 8260 | 8260 | | 8250 | |
| 14. Ash in refuse from coal washing—after drying....% | .... | .... | 55·2 | 42·0 | | 47·6 | |
| Experimental washing tests with heavy solutions on fine crushed coal of official samples | | | | | | | |
| 15. Clean coal of under 1,375 yield % | 45·5 | 54·6 | 60·5 | 51·7 | 62·5 | 48·5 | 48·0 |
| 16. " " " " " ....ash % | 7·8 | 5·5 | 4·1 | 5·4 | 4·4 | 4·4 | 5·3 |
| 17. Bony " " between 1,375 and 1,550 yield % | 31·0 | 24·4 | 24·0 | 35·8 | 23·0 | 27·5 | 41·5 |
| 18. " " " " " " " ....ash % | 20·5 | 15·5 | 15·6 | 15·0 | 15·1 | 7·7 | 16·3 |
| 19. Refuse of over 1,550 .... yield % | 23·5 | 21·0 | 15·5 | 12·5 | 14·5 | 24·0 | 10·5 |
| 20. " " " " .. ash % | 71·0 | 47·0 | 56·3 | 45·6 | 66·0 | 55·5 | 51·9 |
| 21. Useful coal, being combined, clean and bony yield % | 76·5 | 79·0 | 84·5 | 87·5 | 85·5 | 76·0 | 89·5 |
| 22. " " " " " " " ....ash % | 13·0 | 8·4 | 7·3 | 9·5 | 7·3 | 8·5 | 10·4 |
| Summary statement of results of washing | | | | | | | |
| 23. Yield of washed coal—combined product all sizes % | | | 81·7 | 85·5 | | 73·2 | |
| 24. Perfection of yield as compared with heavy solution tests....% | .... | .... | 96·7 | 97·7 | .... | 96·3 | |
| 25. Reduction in ash due to washing....% | .... | .... | 35·9 | 18·1 | .... | 41·4 | |
| 26. Perfection ash reduction compared with heavy solution tests....% | .... | .... | 74·5 | 74·7 | .... | 73·3 | |
| 27. Reduction in sulphur due to washing....% | .... | .... | 16·7 | 37·5 | .... | 0·0 | |
| 28. Increase in calorific value due to washing....% | .... | .... | 7·7 | 4·8 | .... | 12·4 | |
| 29. " " boiler evaporation due to washing....% | .... | .... | 4·8 | 2·4 | .... | 9·3 | |
| 30. Yield of refuse from washing tests....% | .... | .... | 15·8 | 12·8 | .... | 25·7 | |
| 31. Decrease in clinker in boiler furnace due to washing....% | .... | .... | 44·2 | 33·4 | .... | 57·4 | |

### Notes and Comments.

*Lundbreck Basin.*

47 = *Lun-Breckenridge Colliery* (R.M.)* This sample was taken when the mine was shut down and may not represent its normal output. It is a lignitic bituminous coal and contains an exceptionally large amount of ash and also a good deal of slaty matter. It could be very greatly improved by washing but would still run very high in ash. It was not washed.

*Frank-Blairmore-Coleman Field.*

48 = *Leitch Colliery, L.C. Ltd.* (R.M.)*
32 = *Hillcrest, C. & C. Co.* (R.M.)
33 = *No. 1 Seam, Bellevue, W. C. Collieries.* (R.M.)
28 = *No. 1 Seam, Lille, W. C. Collieries.* (R.M.)
34 = *No. 2 Seam, Denison, I. C. & C. Co.* (R.M.)
34 *SP* = *No. 4 Seam, Denison, I. C. & C. Co.* (R.M. and P.)

The above coals are very much alike and can scarcely be intelligibly compared without reference to the full data in Volume III. All are high in ash if compared with so called "high grade coals," but all are low in sulphur and are suitable for coke making if freed from their somewhat excessive ash. Some of the collieries already operate washers or dry cleaning plants for this purpose, and it is probable that it would be commercially advantageous to wash all the coal used for coke making in this field, using screenings in so far as a market could be found for the lump. The time is not yet ripe for washeries for fuel coal in this district.

*P = Hand picked to remove rubbish. R.M. = Run of mine.

TABLE XVI.

## SUMMARY RECORD OF COAL WASHING TESTS, WESTERN CROWSNEST PASS COAL FIELD.

| | | Michel, B.C. | | | Hosmer, B.C. | | | Fernie, B.C. | |
|---|---|---|---|---|---|---|---|---|---|
| Official number of the colliery as per list on page 10, Vol. I, of report | | No. 31 | No. 30 | No. 29 | No. 51 | No. 52 | No. 53 | No. 27 | No. 26 |
| **Proximate analysis, etc., of official samples** | | | | | | | | | |
| 1. Moisture in the check sample sealed at mine | % | 1·4 | 1·9 | 3·0 | 1·7 | 2·6 | 4·0 | 2·2 | 1·6 |
| 2. Volatile matter in main sample after drying | % | 24·8 | 22·6 | 24·1 | 21·3 | 25·6 | 28·0 | 26·3 | 24·0 |
| 3. Fixed carbon " " " " " | % | 62·7 | 65·5 | 65·7 | 63·4 | 62·0 | 64·5 | 64·7 | 65·2 |
| 4. **Ash** " " " " " | % | 12·5 | 11·9 | 10·2 | 15·3 | 12·4 | 7·5 | 9·0 | 10·8 |
| 5. **Sulphur** " " " " " | % | 0·5 | 0·4 | 0·6 | 0·3 | 0·6 | 0·6 | 0·5 | 0·5 |
| 6. Calorific value of " " " " | Cal. | 7370 | 7420 | 7490 | 7060 | 7270 | 7770 | 7680 | 7490 |
| 7. Calorific value calculated to ash free dry coal | Cal. | 8420 | 8420 | 8340 | 8340 | 8300 | 8400 | 8440 | 8400 |
| Proximate analysis, etc., of combined product of large scale washing tests | | | | | | | | | |
| 8. Volatile matter in washed coal after drying | % | 25·2 | | | | | | | |
| 9. **Fixed carbon** " " " " " | % | 68·6 | ... | | | | | | |
| 10. **Ash** " " " " " | % | 6·2 | | | | | | | |
| 11. **Sulphur** " " " " " | % | 0·5 | | | | | | | |
| 12. **Calorific value of** " " " " | Cal. | 7950 | | | | | | | |
| 13. Calorific value calculated to ash free dry washed coal | Cal. | 8480 | | | | | | | |
| 14. **Ash in refuse from coal washing—after drying** | % | 50·7 | | | | | | | |
| Experimental washing tests with heavy solutions on fine crushed **coal of official samples** | | | | | | | | | |
| 15. Clean coal of under 1,375 | yield % | 77·4 | 80·8 | 80·0 | 55·0 | 69·0 | 87·9 | 83·5 | 84·7 |
| 16. " " " " " | ash % | 3·3 | 4·3 | 3·2 | 4·5 | 4·2 | 2·9 | 2·4 | 4·6 |
| 17. Bony " " between 1,375 and 1,550 | yield % | 10·6 | 9·2 | 10·0 | 30·3 | 17·2 | 5·7 | 5·5 | 8·3 |
| 18. " " " " " " " | ash % | 32·9 | 23·2 | 17·7 | 15·1 | 18·2 | 19·3 | 21·4 | 23·2 |
| 19. Refuse of over 1,550 | yield % | 12·0 | 10·0 | 10·0 | 14·7 | 13·8 | 6·4 | 11·0 | 7·0 |
| 20. " " " " | ash % | 57·3 | 60·0 | 60·0 | 58·6 | 52·6 | 55·5 | 56·0 | 69·0 |
| 21. Useful coal, being combined clean and bony | yield % | 88·0 | 90·0 | 90·0 | 85·3 | 86·2 | 93·6 | 89·0 | 93·0 |
| 22. " " " " " " " | ash % | 6·8 | 6·2 | 4·6 | 8·3 | 7·0 | 3·9 | 3·6 | 6·2 |
| **Summary statement of results of washing** | | | | | | | | | |
| 23. **Yield of washed coal—combined product all sizes** | % | 82·0 | ... | ... | ... | ... | | | |
| 24. **Perfection of yield as compared with heavy solution tests** | % | 93·2 | | | | | | | |
| 25. **Reduction in ash due to washing** | % | 50·4 | | | | | | | |
| 26. **Perfection ash reduction compared with heavy solution tests** | % | 109·7 | | | | | | | |
| 27. **Reduction in sulphur due to washing** | % | 0·0 | | | | | | | |
| 28. **Increase in calorific value due to washing** | % | 7·9 | | | | | | | |
| 29. " " boiler evaporation due to washing | % | 5·3 | | | | | | | |
| 30. **Yield of refuse from washing tests** | % | 16·5 | | | | | | | |
| 31. Decrease in clinker in boiler furnace due to washing | % | 59·8 | | | | | | | |

### Notes and Comments.

31 = *Michel No. 3, C.N.P.C. Co.* (S.)*
30 = *Michel No. 7, C.N.P.C. Co.* (S. and P.)
29 = *Michel No. 8, C.N.P.C. Co.* (S. and P.)
51 = *Hosmer No. 2, H. M. Ltd.* (R.M. from development work).
52 = *Hosmer No. 6, H. M. Ltd.* (R.M. from development work).
53 = *Hosmer No. 8, H. M. Ltd.* (R.M. from development work).
27 = *Coal Creek No. 2, C.N.P.C. Co.* (R.M.)
26 = *Coal Creek No. 5, C.N.P.C. Co.* (R.M.)

The above 8 coals, although differing somewhat in ash and other constituents, are all substantially alike in their general characteristics. All are extremely friable and the samples represent only about one-third of the total output of the mines as two-thirds in the average product passes through the ¾" bar screens ordinarily used. The pure coal is more friable than the bone and slate, and, therefore, these tipple samples have the somewhat unusual characteristic of being poorer in quality than their own screenings. All of the coals coke well, and the screenings being the purer part are the more suitable as well as the more profitable portion to coke.

With the exception of No. 51, which was a development sample, none of the coals require washing under present market conditions. They are, however, so constituted as to wash readily with considerable improvement, and as the purchasers of coke become more discriminating several of the mines will find it to their advantage to wash their product before sending it to the ovens. It was only considered necessary to run a washing test on one sample, and No. 31 was chosen as higher in ash than any other producing mine. **The results of this test were quite satisfactory and confirmed expectations based on the specific gravity experiments.**

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*S = Screened coal. P = Hand picked to remove rubbish. R.M. = Run of mine.

## TABLE XVII.

## SUMMARY RECORD OF COAL WASHING TESTS, CASCADE COAL FIELD.

| | | Canmore-Bankhead Field | | | | |
|---|---|---|---|---|---|---|
| Official number of the colliery as per list on page 10, Vol. I, of report | | No. 25 | No. 23 | No. 23SP | No. 23M | No. 24 |
| **Proximate analysis, etc., of official samples** | | | | | | |
| **1. Moisture in the check sample sealed at mine** | % | 1·2 | 1·0 | 1·1 | | 2·7 |
| **2. Volatile matter in main sample after drying** | % | 17·2 | 11·8 | 12·6 | 12·6 | 17·1 |
| **3. Fixed carbon " " " " "** | % | 70·5 | 76·0 | 71·5 | 73·3 | 68·6 |
| **4. Ash " " " " "** | % | 12·3 | 12·2 | 15·9 | 14·1 | 14·3 |
| **5. Sulphur " " " " "** | % | 0·8 | 0·6 | 0·6 | 0·6 | 0·6 |
| **6. Calorific value of " " " "** | Cal. | 7340 | 7400 | 7040 | 7270 | 7280 |
| **7. Calorific value calculated to ash free dry coal** | Cal. | 8370 | 8430 | 8370 | 8460 | 8490 |
| **Proximate analysis, etc., of combined product of large scale washing tests** | | | | | | |
| **8. Volatile matter in washed coal after drying** | % | 16·2 | | | 12·5 | |
| **9. Fixed carbon " " " " "** | % | 77·9 | | | 78·6 | |
| **10. Ash " " " " "** | % | 5·9 | | | 8·9 | |
| **11. Sulphur " " " " "** | % | 0·7 | | | 0·6 | |
| **12. Calorific value of " " " "** | Cal. | 8000 | | | 7760 | |
| 13. Calorific value calculated to ash free dry washed coal | Cal. | 8500 | | | 8520 | |
| 14. Ash in refuse from coal washing—after drying | % | 54·1 | | | 55·4 | |
| Experimental washing tests with heavy solutions on fine crushed coal of official samples | | | | | | |
| **15. Clean coal of under 1,375** | yield % | 74·5 | | | 58·0 | |
| **16. " " " " "** | ash % | 2·1 | | | 2·7 | |
| **17. Bony " " between 1,375 and 1,550** | yield % | 9·5 | | | 21·0 | |
| **18. " " " " " " "** | ash % | 13·2 | | | 17·2 | |
| **19. Refuse of over 1,550** | yield % | 16·0 | | | 21·0 | |
| **20. " " " "** | ash % | 50·6 | | | 46·0 | |
| **21. Useful coal, being combined clean and bony** | yield % | 84·0 | | | 79·0 | |
| **22. " " " " " " "** | ash % | 3·7 | | | 6·0 | |
| Summary statement of results of washing | | | | | | |
| 23. Yield of washed coal—combined product all sizes | % | 81·5 | | | 84·0 | |
| **24. Perfection of yield as compared with heavy solution tests** | % | 97·0 | | | 106·2 | |
| **25. Reduction in ash due to washing** | % | 52·0 | | | 36·9 | |
| **26. Perfection ash reduction compared with heavy solution tests** | % | 62·7 | | | 67·4 | |
| **27. Reduction in sulphur due to washing** | % | 12·5 | | | 00·0 | |
| **28. Increase in calorific value due to washing** | % | 9·0 | | | 6·7 | |
| **29. " " boiler evaporation due to washing** | % | 13·1 | | | 14·1 | |
| **30. Yield of refuse from washing tests** | % | 17·2 | | | 13·7 | |
| **31. Decrease in clinker in boiler furnace due to washing** | % | 43·2 | | | 36·7 | |

### Notes and Comments.

25 = *No. 1 Mine, Canmore, H. McNeil Co.* This sample was taken during the last days of a mine which originally produced an exceptionally high class fuel. The sample, however, contained a good deal of removable slate and bone, which thus raised the ash to a fairly high amount. The coal was washed and its quality very decidedly improved, but as it is non-coking it may not pay to wash it under present market conditions.

23 = *Pea Size Bankhead Anthracite, Banff.* (Dry cleaned.)

23 SP = *Buckwheat size Bankhead Anthracite, Banff.* (Dry cleaned.)

23 M = *Mixture of equal parts of Pea and Buckwheat size.* (Dry cleaned.)

This coal is an anthracite and the samples were taken from stocks of coal dry cleaned in a "breaker" with screens and automatic slate pickers. A washing test was run to see whether the dry cleaned coal could be materially improved by wet treatment and the results are interesting. Undoubtedly wet treatment even alone will give a better product than dry, but probably it will cost more and it may involve heavier losses of fines.

24 = *Briquettes from Bankhead Coal.* These briquettes are produced from the dust which would be otherwise wasted. Tar is added in proper proportions and the mass compressed in moulds. The sample was not washed.

TABLE XVIII

## SUMMARY RECORD OF COAL WASHING TESTS, COAST RANGE COAL FIELDS.

| | | Granite Creek, B.C. | | | Nicola, B.C. | | | Whitehorse, Y.T. | |
|---|---|---|---|---|---|---|---|---|---|
| Official number of the colliery as per list on page 10, Vol. I, of report | | Ex. No. 1 | Ex. No. 2 | Ex. No. 3 | No 22 | No 22 SP | No 22 M | Ex. No 31 | Ex. No 32 | Ex. No. 33 |
| Proximate analysis, etc., of official samples | | | | | | | | | | |
| 1. Moisture in the check sample sealed at mine | % | | | | 4·4 | 2·9 | | | | |
| 2. Volatile matter in main sample after drying | % | 33·7 | 32·4 | 32·1 | 39·1 | 39·0 | 39·1 | 25·0 | 26·7 | 27·8 |
| 3. Fixed carbon " " " " " | % | 54·0 | 53·6 | 51·9 | 46·4 | 48·1 | 46·8 | 58·0 | 54·1 | 56·0 |
| 4. Ash " " " " " | % | 12·3 | 14·0 | 16·0 | 14·5 | 12·9 | 14·1 | 17·0 | 19·2 | 16·2 |
| 5. Sulphur " " " " " | % | | 1·9 | | 0·9 | 0·7 | 0·9 | 0·5 | 0·5 | 0·5 |
| 6. Calorific value of " " " " | Cal | | | | 6490 | 6760 | 6510 | 6700 | 6310 | 6790 |
| 7. Calorific value calculated to ash free dry coal | Cal | | | | 7590 | 7760 | 7580 | 8070 | 7810 | 8100 |
| Proximate analysis, etc., of combined product of large scale washing tests | | | | | | | | | | |
| 8. Volatile matter in washed coal after drying | % | | | | | | 39·8 | 26·3 | 25·7 | 28·1 |
| 9. Fixed carbon " " " " " | % | | | | | | 50·2 | 59·9 | 60·3 | 59·2 |
| 10. Ash " " " " " | % | 7·9 | 10·4 | 13·9 | | | 10·0 | 13·8 | 14·0 | 12·7 |
| 11. Sulphur " " " " " | % | | 1·8 | | | | 0·9 | 0·5 | 0·4 | 0·5 |
| 12. Calorific value of " " " " | Cal. | | | | | | 7010 | 7110 | 7070 | 7210 |
| 13. Calorific value calculated to ash free dry washed coal | Cal | | | | | | 7790 | 8250 | 8220 | 8260 |
| 14. Ash in refuse from coal washing—after drying | % | | | | | | 45·8 | 43·5 | 45·8 | 50·1 |
| Experimental washing tests with heavy solutions on fine crushed coal of official samples | | | | | | | | | | |
| 15. Clean coal of under 1,375 yield | % | 84·0 | 77·9 | 65·0 | | | 74·5 | 38·0 | 23·0 | 53·0 |
| 16. " " " " " ash | % | 5·9 | 6·2 | 7·3 | | | 6·1 | 4·5 | 5·2 | 5·3 |
| 17. Bony " " between 1,375 and 1,550 yield | % | 7·5 | 12·1 | 23·0 | | | 16·5 | 40·0 | 50·5 | 24·7 |
| 18. " " " " " " " " ash | % | 25·0 | 24·8 | 23·6 | | | 23·6 | 14·2 | 14·7 | 15·3 |
| 19. Refuse of over 1,550 yield | % | 8·5 | 10·0 | 12·0 | | | 9·0 | 22·0 | 26·5 | 22·3 |
| 20. " " " " ash | % | 56·7 | 60·0 | 57·0 | | | 61·0 | 43·5 | 46·8 | 40·0 |
| 21. Useful coal, being combined clean and bony yield | % | 91·5 | 90·0 | 88·0 | | | 91·0 | 78·0 | 73·5 | 77·7 |
| 22. " " " " " " " ash | % | 8·2 | 8·8 | 11·6 | | | 9·2 | 9·5 | 11·7 | 8·5 |
| Summary statement of results of washing | | | | | | | | | | |
| 23. Yield of washed coal—combined product all sizes | % | 85·0 | 90·0 | 90·0 | | | 87·0 | 81·0 | 76·5 | 83·0 |
| 24. Perfection of yield as compared with heavy solution tests | % | 92·9 | 100·0 | 102·2 | | | 95·7 | 103·8 | 104·0 | 106·8 |
| 25. Reduction in ash due to washing | % | 35·7 | 25·7 | 13·2 | | | 29·1 | 18·8 | 27·1 | 21·6 |
| 26. Perfection ash reduction compared with heavy solution tests | % | 103·8 | 84·6 | 83·4 | | | 92·0 | 68·8 | 83·5 | 66·9 |
| 27. Reduction in sulphur due to washing | % | | 5·3 | | | | 0·0 | 0·0 | 20·0 | 00·0 |
| 28. Increase in calorific value due to washing | % | | | | | | 7·7 | 6·1 | 12·0 | 6·2 |
| 29. " " boiler evaporation due to washing | % | | | | | | 2·3 | | | |
| 30. Yield of refuse from washing tests | % | | | | | | 12·8 | 14·7 | 21·5 | 13·8 |
| 31. Decrease in clinker in boiler furnace due to washing | % | | | | | | 25·7 | | | |

### Notes and Comments.

*Granite Creek Field.*

*Ex. 1 = No. 1 Granite Creek.* (R.M.)*
*Ex. 2 = No. 2 Granite Creek.* (R.M.)
*Ex. 3 = No. 4 Granite Creek.* (R.M.)
These three samples of about 150 pounds each were from prospect tunnels in a new field. They show the coals to be of fairly good quality and to wash rather well, but the samples were from near the surface and were small in quantity and the property will have to be more fully developed before truly representative samples can be taken.

*Nicola Field.*

22 = *No. 1 Colliery, Nicola V. C. & C. Co.* (R.M.)
22 SP = *No. 2 Colliery, Nicola V. C. & C. Co.* (R.M.)
22 M = *Mixture of 140 sacks of No. 1 and 10 sacks No. 2.* (R.M.)
These samples are very much alike. The mixture was washed with fairly good results and shows that the coal can be decidedly improved by treatment, but market conditions probably do not at present justify the erection of a washery.

*Whitehorse Field.*

*Ex. 31 = Upper Seam, Tantalus Mine.*
*Ex. 32 = Middle Seam, Tantalus Mine.*
*Ex. 33 = Lower Seam, Tantalus Mine.*
These samples also weighed about 200 pounds each but the mine had been more fully developed than at Granite Creek and they are probably more representative. They show high ash but rather low sulphur. The specific gravity tests indicate fairly easy washing to a yield of say 75 per cent carrying 13 per cent ash. Greater purity than this can only be secured by unduly increasing the amount of material wasted.

*R.M. = Run of mine.

TABLE XIX

## SUMMARY RECORD OF COAL WASHING TESTS, VANCOUVER ISLAND COAL FIELDS.

| | | Nanaimo-Comox Field | | | | | | Alert Bay |
|---|---|---|---|---|---|---|---|---|
| Official number of the colliery as per list on page 11, Vol. I, of report.......... | | No 20 | No 18 | No 17 | No 21 | No 21SP | No 21M | Ex. No 34 |
| Proximate analysis, etc., of official samples | | | | | | | | |
| 1. Moisture in the check sample sealed at mine........................ | % | 1·8 | 2·2 | 2·4 | ........ | ........ | ........ | ........ |
| 2. Volatile matter in main sample after drying ........................ | % | 40·1 | 41·2 | 41·5 | 31·6 | 28·0 | 30·2 | 34·3 |
| 3. Fixed carbon " " " " " ........................ | % | 49·8 | 48·5 | 46·6 | 56·5 | 60·1 | 57·8 | 42·7 |
| 4. Ash " " " " " ........................ | % | 10·1 | 10·3 | 11·9 | 11·9 | 11·9 | 12·0 | 23·0 |
| 5. Sulphur " " " " " ........................ | % | 0·4 | 0·9 | 1·3 | 1·0 | 0·9 | 0·9 | 1·0 |
| 6. Calorific value of " " " " | Cal | 7310 | 7130 | 6930 | 7150 | 7240 | 7250 | 6170 |
| 7. Calorific value calculated to ash free dry coal | ..Cal | 8130 | 7950 | 7870 | 8120 | 8180 | 8220 | 8010 |
| Proximate analysis, etc., of combined product of large scale washing tests | | | | | | | | |
| 8. Volatile matter in washed coal after drying | % | | | | | | 30·8 | 36·7 |
| 9. Fixed carbon " " " " " ........................ | % | | | | | | 60·3 | 48·2 |
| 10. Ash " " " " " ........................ | % | ........ | ........ | ........ | ........ | ........ | 8·9 | 15·1 |
| 11. Sulphur " " " " " ........................ | % | ........ | ........ | ........ | ........ | ........ | 0·8 | 0·9 |
| 12. Calorific value of " " " " ........................ | Cal. | ........ | ........ | ........ | ........ | ........ | 7550 | 6420 |
| 13. Calorific value calculated to ash free dry washed coal.............. | Cal. | ........ | ........ | ........ | ........ | ........ | 8290 | 7560 |
| 14. Ash in refuse from coal washing—after drying...................... | % | ........ | ........ | ........ | ........ | ........ | 50·6 | ........ |
| Experimental washing tests with heavy solutions on fine crushed coal of official samples | | | | | | | | |
| 15. Clean coal of under 1,375.................................. | yield % | 86·0 | 86·5 | 84·7 | ........ | ........ | 80·0 | 62·6 |
| 16. " " " " ........................................ | ash % | 5·5 | 6·8 | 8·1 | ........ | ........ | 5·3 | 4·5 |
| 17. Bony " " between 1,375 and 1,550....................... | yield % | 6·0 | 10·0 | 11·1 | ........ | ........ | 13·0 | 13·9 |
| 18. " " " " " " " ........ | ash % | 22·7 | 20·0 | 18·6 | | | 21·7 | 23·7 |
| 19. Refuse of over 1,550........................................ | yield % | 8·0 | 3·5 | 4·2 | ........ | ........ | 7·0 | 23·5 |
| 20. " " " " ........................................ | ash % | 45·0 | 52·5 | 59·4 | ........ | ........ | 71·5 | 54·0 |
| 21. Useful coal, being combined clean and bony | yield % | 92·0 | 96·5 | 95·8 | ........ | ........ | 93·0 | 76·5 |
| 22. " " " " " " " ........................ | ash % | 6·5 | 8·2 | 9·3 | ........ | ........ | 7·6 | 8·0 |
| Summary statement of results of washing | | | | | | | | |
| 23. Yield of washed coal—combined product all sizes | % | | | | | | 87·5 | 80·6 |
| 24. Perfection of yield as compared with heavy solution tests | % | | | | | | 94·2 | 106·0 |
| 25. Reduction in ash due to washing | % | | | | | | 25·8 | 34·3 |
| 26. Perfection ash reduction compared with heavy solution tests | % | | | | | | 85·4 | 52·9 |
| 27. Reduction in sulphur due to washing | % | | | | | | 11·1 | 10·0 |
| 28. Increase in calorific value due to washing | % | | | | | | 4·4 | 4·1 |
| 29. " " boiler evaporation due to washing | % | | | | | | 5·5 | ........ |
| 30. Yield of refuse from washing tests | % | | | | | | 12·0 | |
| 31. Decrease in clinker in boiler furnace due to washing | % | | | | | | 33·3 | |

## Notes and Comments.

*Nanaimo-Comox Field.*

20 = *Extension Mine, Wellington Colliery Co.* (S. and P.)* This [illegible] does not require washing and [illegible] be improved by treatment and would yield [illegible] large percentage [illegible] about 7 per cent ash [illegible] washing even now.

18 = *Upper South Nanaimo Seam, W. F. C., No. 1* (S. and P.) This coal [illegible] would be difficult to improve [illegible] washing.

17 = *North Level Nanaimo Seam, W. F. C., No. 1* (S. and P.) This coal like the others [illegible] the specific gravity tests show that no great improvement could be effected owing to the high [illegible] to justify treatment.

21 = *Comox No. 4, W. C. Co.* (S. and P.)

21 *SP* = *Comox No. 7, W. C. Co.* (S. and P.)

21 *M* = *Mixture of equal parts of the above* (S. and P.) This sample does not need washing any more than the other coals of the district [illegible] the specific gravity tests showed it to be more likely to be benefited. It was therefore washed successfully. The screenings would [illegible]

*Alert Bay Field*

*Ex. 34 = Suquash Mines, P. C. Coal Co.* This sample was provided by the owners for a private test the results of which [illegible] The mine was in an early stage of development and the sample was [illegible] much dirtier than the commercial [illegible] Washing reduced the ash and sulphur [illegible] materially but even better results would have been [illegible] had the [illegible] finer. It is probable that [illegible] results could be obtained in practice [illegible] as the mine goes deeper.

*S = Screened coal. P = Hand picked to remove rubbish